MODERN PLASTICS

SEPTEMBER 1949

It pays to use your custom molder's know-how

Say Admiral officials, who think BIG in production, sales—and plastics

No. 9 in a series on Plastics Skill at Work...

PROJECT
One-piece cabinet for floor model television set

CUSTOMER
Admiral Corporation
Chicago, Illinois

MOLDER
Molded Products Corporation

MATERIAL
High grade phenolic molding compound

WORLD'S LARGEST (35 lb.) compression-molded television cabinets are produced in six minutes. Recently developed low-pressure molding materials open new possibilities in molding larger one-piece units.

LOWER SELLING PRICE results from elimination of many finishing operations necessary with other materials. This big television housing comes from mold ready for assembly, has integral lustrous finish.

To give its dealers a tremendous selling edge with the lowest priced television console ever offered, Admiral Corporation had the courage to order the largest phenolic plastic molding ever made in this country.

Weighing no less than 35 pounds as it comes from the mold, this job has design and production implications for manufacturers in many fields outside of radio-television. The use of phenolic material enabled Admiral to eliminate many expensive hand-finishing operations. As a result its costs were cut, sets turned out faster, and big savings passed on to the retail customer through lower prices. Sales are soaring.

The consulting firm and molder of the new console is Molded Products Corporation, who undertook this difficult assignment after balancing all risks against their own skill with plastics. Long familiar with the qualities of Durez phenolic molding compounds, they chose a phenolic material for dimensional stability, glossy finish, light weight, and low cost... qualities *you may well want for your products.*

When you need the right material for the right job, plan on using Durez. Your Durez field man has wide experience. He will gladly serve you and your molder in planning sessions.

A new hit with plastics users everywhere is the handy "Durez Check-Chart." Write for yours. Durez Plastics & Chemicals, Inc., 129 Walck Rd., N. Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB

The Use of *Catalin* STYRENE can direct a Shower of Sales your way, too!

When your product ideas seem worthy of venture—then Catalin Styrene is the one plastic material that will make them *look* and *worth* the money! And both mean volume sales!

Proprietary molders like Nu-Dell Mfg. Co. of Chicago, marketers of a broad line of ingenious weather forecasters, picture frames, serving and cutlery trays, tissue dispensers, necktie racks, etc., have long realized and utilized the sales and production advantages of Catalin Styrene. Product prices, due to the low cost and greater yield per pound of Catalin Styrene, can be held to a minimum so that mass markets can be reached and mass production maintained.

When planning your next product venture, we suggest you investigate Catalin Styrene's superior advantages.
Write for full particulars. Inquiries invited.

CATALIN CORPORATION OF AMERICA

ONE PARK AVENUE, NEW YORK 16, NEW YORK

MODERN PLASTICS*

VOLUME 27 SEPTEMBER 1949 NUMBER 1

CONTENTS

GENERAL

Better Machines for Better Products (Editorial) 5

What Your Dollar Buys in Molded Plastics 75
Important facts and figures show the economic value of plastics to manufacturers

Radically New Shaver 79
Latest electric shaver incorporates acetate, propionate, phenolic, and nylon parts

Vinyl Welting Outlasts the Shoe 81
Leather is being replaced with savings in material and production costs

Letting Light In 82
Acrylic and polyester-laminate sheets make ideal skylights and windows for corrugated buildings

Nitrile Rubber-Phenolic Blends 84
by R. C. Bascom
Plastic and rubber combine to improve each other

Carpeting from a Calender 87
Three-dimensional effect obtained by deep-embossing a vinyl sheet on colored background

Plastics on the Wall 88
What wall tiles, laminates, and other rigid wall coverings offer the consumer

Improving Vinyl Film Products 92
New equipment and techniques speed fabrication, extend fields of application

Plastics Parts in Syrup Dispenser 96
Fountain service unit is utilitarian, has wide sales appeal

Plastics Products 98
How plastics contribute to quality, versatility, and value in new merchandise

Flexible Car Window 138

Diagnostic Heart Meter 142

Hack-Saw Handle 144

Atomizer Bottle 146

Giant Pencil Molded of Polystyrene 148

Water Cooler 150

Typewriter Cutting Knife 152

Toothbrush Display 154

PLASTICS ENGINEERING

Mass Production Boat Building 103

Redesigned for Plastic Molding 110
by A. B. Fox and Gerard V. Delaire

TECHNICAL

Autographic Method for Measuring Stiffness of Nonrigid Plastics 115
by R. D. DeWoord

Saccharification Lignin Concentrates in Phenolics 119
by T. F. Clark

DEPARTMENTS

Plastics Digest 120

U. S. Plastics Patents 122

Plastics Stock Molds 128

Books and Booklets 130

New Machinery and Equipment 132

Production of Plastics Materials 136

The Plastiscope 170
News of the Industry; Predictions and Interpretations; Company News; Personal; Meetings

PUBLICATION OFFICE: Orange, Conn. Executive and Editorial Office: 122 E. 42nd St., New York 17, N. Y. Published each month by Modern Plastics, Inc. Entered as second class matter, at the Post Office at Orange, Conn., under the act of March 3, 1879.

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Subscription $5.00 a year, $8.00 for two years in the U. S., its possessions and South America. Canadian subscriptions $5.50 a year, $9.00 for two years. All other countries $6.00 a year, $10.00 for two years, payable in U. S. currency. Price of this issue 75¢ per copy.

*Reg. U. S. Patent Office.

Dry, light and handsome!

. . . another typical improvement by Geon polyvinyl resins

BEFORE you hand this ad to your wife, take a minute to find out what baby pants can do for you in the way of ideas!

These "Breeth-eez" baby pants are made of Geon polyvinyl resin which gives them their wonderful lightness, makes them waterproof, washable and handsome.

It's quite a jump from baby pants to heavy-duty flooring, flame-resistant draperies, electrical insulation, upholstery and the many other things made from Geon materials. But that's the amazing thing about these versatile materials. They can be calendered, used as a coating, extruded or molded. Think of Geon as a great product improver or product originator. Perhaps it will give you an idea for a product of your own or one that needs revitalizing.

We make no finished products, but we are ready to give you full information and suggestions for the most profitable use of Geon. Write Dept. N-9, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

"Rand Breeth-eez" baby pants by Rand Rubber Company, Inc., Brooklyn, N. Y.

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

Chicago Molded Plastics — of course!

Soldering small connections quickly is no problem for the owner of a Drake "Instant Heat" Solder Gun. Just flick the switch and the iron is hot in a few seconds. An electric light throws a spot directly on the point to be soldered . . . and the job is done . . . easily . . . without waiting for the iron to heat.

The gleaming red housing is Chicago Molded Plastics, of course. The plunger molded phenolic material provides excellent heat and electrical insulation and holds the weight of this portable tool to a minimum.

* * * *

Here, again, molded plastics have been utilized to enhance the quality and utility of a product with definite production economies resulting.

The sleek, colorful housing gives this equipment tremendous sales appeal. It looks every inch the fine tool that it is. The plastic material selected insures rigidity and strength, yet is light in weight and contributes materially to ease of handling. Likewise, it provides high electrical and heat insulation insuring both comfort and safety. Since the entire housing and pistol-grip handle are molded as a simple two-piece unit, assembly operations are reduced to a minimum resulting in lower production costs.

These combined advantages could not have been obtained in any other type of material. Furthermore, the nature of the job called for the plunger molding process. No other method would produce such uniform density and accuracy in the molded part. At the same time, production is fast and economical. It is a situation which again illustrates the importance of selecting the right plastic molder . . . one with knowledge that comes with experience . . . with unlimited facilities for all molding methods and the ability to use the one best suited to the job.

You'll find Chicago Molded fully measures up to these requirements. The fact that America's industrial leaders come to us again and again is ample evidence. So . . . whether you are merely in the "discussion" stage or are ready for quotations, talk things over with a Chicago Molded engineer. There's no obligation.

CHICAGO MOLDED PRODUCTS CORPORATION

1046 N. Kolmar Ave., Chicago 51, Ill.

COMPRESSION, INJECTION AND PLUNGER MOLDING OF ALL PLASTIC MATERIALS

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MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

EDITORIAL

Better Machines for Better Products

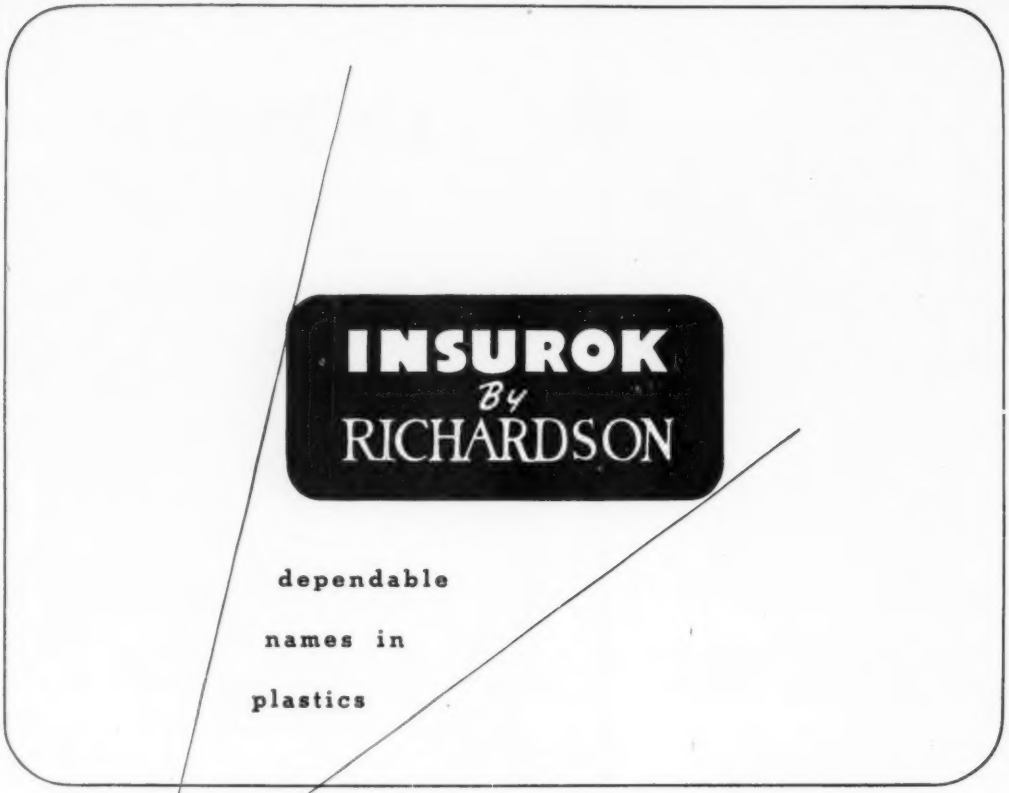
Every producer of plastics products is not only confronted with the task of keeping up-to-date on new and improved materials with which to work, but he must also be constantly on the alert for the development of new equipment with which to make things from his materials.

Among the most sought-after routes toward improved production is a compounding method for various plastic materials that will produce a well-mixed compound at low cost. Whether the compounding is for the purpose of incorporating pigment, plasticizers, or fillers with a resin base, the principal idea is to produce a material that can be molded, extruded, or calendered more efficiently and at lower cost.

Many of the machines used for compounding in the plastic industry have been adaptations of those used in the rubber industry rather than machines based on the premise that plastics are materials which require specialized equipment. Machinery manufacturers have been fully aware of this situation, and have been hard at work on the many problems involved.

The results of this work are rapidly becoming apparent. Within the last few months a wide variety of new equipment for compounding and extrusion has been announced. The improved operation that can be obtained with this new machinery is of tremendous importance to the plastics industry. Competition and experience will expedite further improvements at a rate that no man can yet accurately predict. Every plastics processor owes it to himself to watch these developments carefully in the light of the effect which they can have on his own business.

The manufacturers of machines for processing thermoplastics are indeed alert to the needs of the industry. They have done a grand job of producing specialized equipment which, properly utilized, will produce better plastics products more economically. Now it's up to the thermoplastics operators themselves. They must be constantly aware of the ever-impending threat of equipment obsolescence. They must be ready and willing to adopt and adapt the practical new ideas and improved equipment as they become available. They must couple these new production facilities with enterprise in selling. By these means will thermoplastic compounding, molding, and extruding reach new heights of production efficiency. And as these new heights are reached, much of the credit must go to the enterprising machinery manufacturers who have provided the tools with which to work.



EXPERIENCE is just one of the factors that make the names of INSUROK and Richardson more significant to manufacturers whose products require laminated or molded plastics. Richardson customers benefit from this experience in many ways.

(1) Richardson experience with a wide variety of plastic materials helps you select the one that accomplishes your purpose most effectively, efficiently and economically.

(2) Richardson experience in the design and production of Laminated INSUROK and Molded INSUROK products has resulted in savings to scores of manufacturers.

(3) Richardson's many proven grades of Laminated INSUROK are available in sheet, rod or tube stock or in fabricated, punched or post-formed component parts for an endless variety of applications.

(4) INSUROK plastic products and Richardson services have played an important part in the development and refinement of many products.

It might be to our mutual advantage to know how these materials and services can work for you.

INSUROK is a registered trade-mark of The Richardson Company

The RICHARDSON COMPANY

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Sales Headquarters: MELROSE PARK, ILLINOIS

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CAN "LUCITE" GIVE YOUR SALES A LIFT?

Letters as above vacuum-drawn from .060 to .250 "Lucite" sheet, in sizes from 2" to 24" high. Made and stocked by Polyplastic Co., Brooklyn, N. Y

When you're thinking of ways to spark your sales, *keep Lucite* acrylic resin in mind.* Manufacturers across the country today are using this Du Pont plastic to create many new and unusual products, such as the formed "Lucite" sign letters shown above. "Lucite" is beautiful, tough, weather-resistant, conducts light, is easy to fabricate, requires only soap and water to maintain. It's available in crystal-clear, and a range of sun-fast colors, transparent, translucent and opaque. Write for data—keep it handy in your files. E. I. du Pont de Nemours & Co. (Inc.), Plastics Dept., Main Sales Offices: 350 Fifth Ave., New York 1, N. Y.; 7 S. Dearborn St., Chicago 3, Illinois; 845 E. 60th St., Los Angeles 1, California.

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DU PONT
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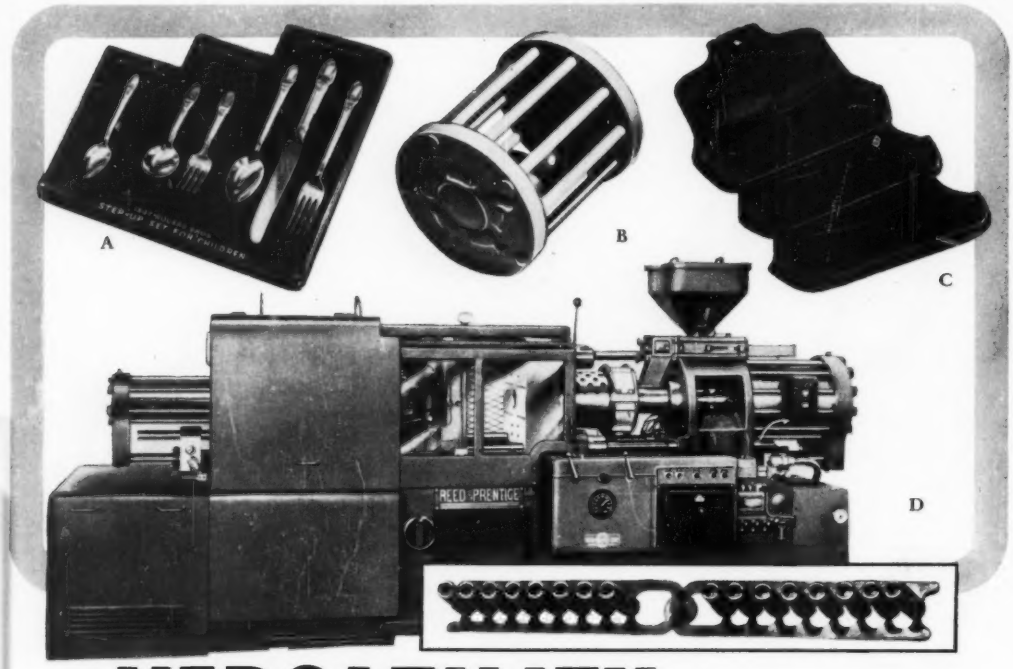
Plastics
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY



VERSATILITY...

Each of these plastic products had a different production problem, yet each was molded on Reed-Prentice 10D-8 Oz. injection machines.

Whether the molding job calls for extreme accuracy, rapid cycle, distribution of the material over a large mold area or the complete filling of a deep mold, the 10D-8 Oz. model has the versatility required by many molders for profitable operation. Over 1300 of these popular machines are in use today, molding such plastic products as keyed below:

(A) 1847 Rogers silverware clear-vision counter display cases, molded by the F. J. Kirk Molding Co., of Clinton, Mass.
(B) Handleless baby rattles, molded in pastel shades by Trimold, Inc., of Buffalo, N. Y.
(C) Spectacle cases, molded from polyethelene by Westplex Corp. of Rochester, N. Y.
(D) Ignition cable connectors, molded from Tenite I, by the Parker Appliance Co., of Cleveland, Ohio.

10D-8 Oz. Specifications

Die locking pressure, tons	250
Max. casting area, sq. in.	100
Mold opens	10¼"
Max. die space	16"
Size: die plates	21 x 25"
Oz. molded per shot (acetate)	8
Pressure psi on material	20,000

Manufacturers of a complete machine line . . . 2, 4, 8, 10, 12, 16, 24, 32 and 60 oz. capacity models. Write Dept. D for circular "A Complete Service on Injection Molding."

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

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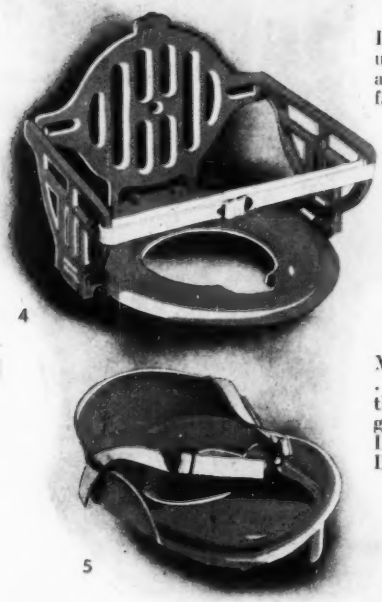
INJECTION
REED-PRENTICE CORP.
WORCESTER MACHINES MASS., U.S.A.

CLEVELAND
1213 West 3rd Street

LOS ANGELES
2314 Santa Fe Ave.

Lumarith*

The Choice of 5 Leading Manufacturers of Trainer Seats



Look at the selling points that Lumarith gives to a product, and you'll understand why this Celanese plastic formulation is specified again and again for trainer seats . . . why it is selected by the top 5 manufacturers in the field.

EASY CLEANABILITY: Soap and water, household cleansers, and disinfectants are *safe* for Lumarith.

SATIN-SMOOTH, TOUCH PLEASANT SURFACE: Lumarith actually becomes more lustrous with wear. Low thermal conductivity means a surface that's not too hot . . . not too cold.

CLEAR THROUGH COLOR: No paint to chip . . . no color to wear off . . . a product that looks *new* for years.

SHATTERPROOF TOUGHNESS: Toughness without reservations . . . tensile and impact strength that leave a wide margin of safety for *any* product.

MORE QUALITIES THE MANUFACTURER LIKES

Moldability at high speeds . . . machinability without stress fractures . . . strength with less material and thinner cross sections—and a price that is the lowest ever. If you want these qualities for your product, get in touch with your Celanese representative for the up-to-date Lumarith story. Celanese Corporation of America, Plastics Division, Dept. 1—I, 180 Madison Avenue, New York 16, N. Y.

Celanese* PLASTICS

1. Baby Doo . . . Bunny Bear Products, Everett, Mass. • Molded by Dapol Plastics, Inc., Worcester, Mass.
2. Tot Trainer . . . Abell Mfg. Co., New York • Molded by Plastic Molded Arts, Inc., Long Island City, N. Y.
3. Lit'l Tyke . . . Plastic Manufacturers, Inc., Dallas, Texas
4. The Little Duke . . . Duke Manufacturing Company, Inc., Newark, N. J.
5. John-ee . . . Columbia Protektosite Co., Inc., Carlstadt, N. J.

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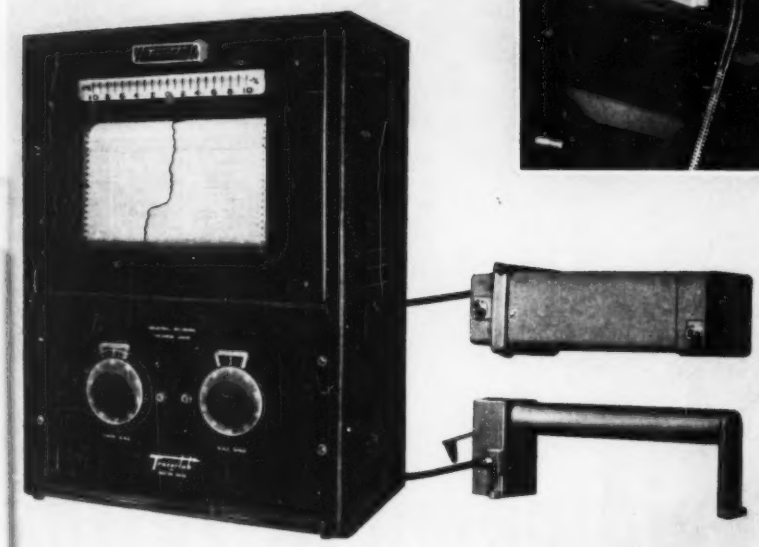
The Tracerlab
BETA GAUGE

FOR PLASTIC FILM AND SHEET . . . .

RUBBER . . . . COATED TEXTILES

A typical Tracerlab Beta Gauge installation for measuring thickness of sheet material.



ELIMINATE OFF-WEIGHT REJECTS . . . . . IMPROVE QUALITY CONTROL

SAVE RAW MATERIALS . . . . . DECREASE VARIATIONS ACROSS SHEET

WITH THIS NEW NON-CONTACTING THICKNESS GAUGE

The Tracerlab Beta Gauge is a completely new and unique instrument for measuring and recording weight per unit area or thickness of various materials directly on the production line. It uses beta radiation from Oak Ridge produced radioisotopes to achieve a high degree of accuracy and sensitivity and is unaffected by variations in chemical composition of the material being measured. This is a non-contacting type of gauge designed for the severe operating conditions usually encountered in production operations. In addition to the recording type, a non-recording industrial model and a laboratory model of the Tracerlab Beta Gauge are also available.

Let us know your gauging problems and we will gladly advise you how the Tracerlab Beta Gauge can help you.

Write for Beta Gauge Bulletin M-20

A FEW TYPICAL USES

Measuring weight per unit area or thickness of the following:

VINYL PLASTIC FILM

SHEET RUBBER

CELLOPHANE

FOAM RUBBER

PHOTOGRAPHIC FILM BASE

RUBBER TIRE STOCK

COATED TEXTILES

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ADHESIVE COATED PLASTIC FILM

METHACRYLATE SHEET

PLASTIC COATED PAPER

ARTIFICIAL LEATHER

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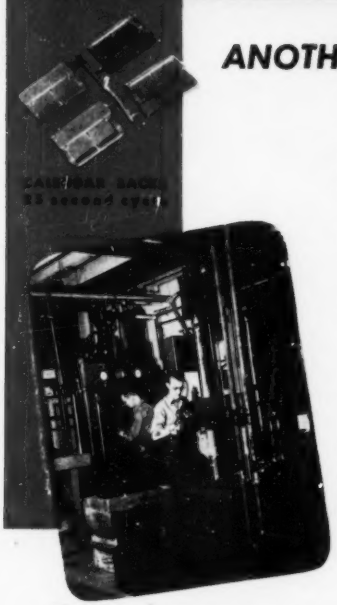
TRACERLAB INC., 130 HIGH STREET, BOSTON 10, MASS.



ANOTHER 100% H-P-M INSTALLATION- AT BROWN AND BIGELOW!

Here's a prominent manufacturer who was quick to see the tremendous possibilities of plastics. Their line of advertising novelties includes hundreds of plastic items from thimbles to ball point pens . . . all molded on H-P-M equipment.

You, too, can produce attractive products at low cost with H-P-Ms. Their fast cycle, quick mold set-up and dependable performance make them the accepted standard in the plastics industry. Regardless of the size of parts to be injected molded . . . 4 oz. . . . 9 oz. . . . 16 oz. . . . 48 oz. . . . there's an H-P-M for the job! For molding thermo-setting materials, H-P-M compression and transfer molding presses can't be beat!

Investigate the many money saving advantages of H-P-M all-hydraulic molding machines. Call in a nearby H-P-M engineer to discuss modern plastics production methods with you. There's no obligation.

THE HYDRAULIC PRESS MFG. COMPANY
1010 Marion Road **Mount Gilead, Ohio, U. S. A.**

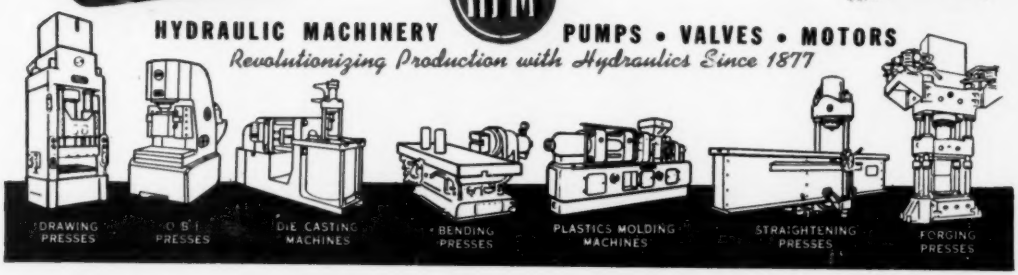
H-P-M plunger type transfer molding presses produce plastic ash trays by the millions at Brown and Bigelow.

Write for free copies of these bulletins — 4404 (A general treatise on plastics molding) — 4302 (H-P-M injection machines) — 4901 (H-P-M compression and transfer presses).

HPM

HYDRAULIC MACHINERY **PUMPS • VALVES • MOTORS**

Revolutionizing Production with Hydraulics Since 1877



SHOOT *LARGER MOLDINGS* *NEW WATSON-STILLMAN* 48 oz.

Another FIRST, bears the *WATSON-STILLMAN* trade-mark. It's the *NEW* Model 48E-1000 W-S Injection Molding Machine—largest standard type available . . . anywhere.

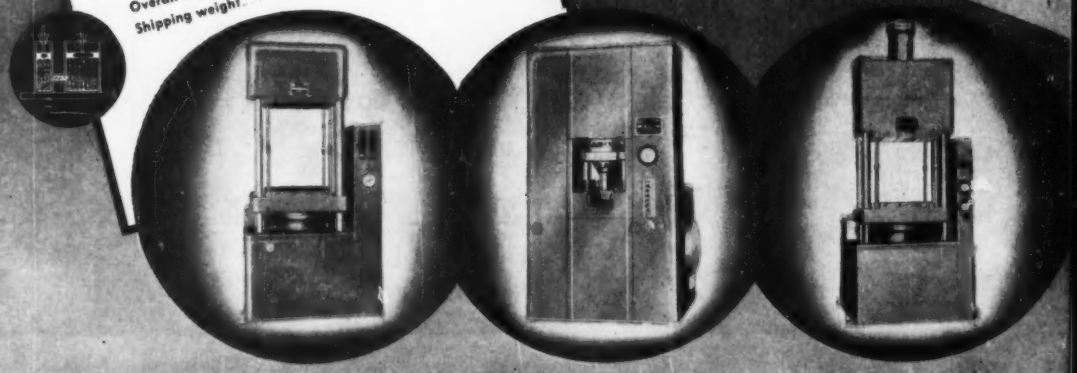
This latest advance in plastics machinery engineering will increase *YOUR* profits . . . give *YOU* a better competitive position, because it materially extends the size-range of products which can be molded in one piece by this process. Model 48E-1000 not only provides greater capacity over previous standards but permits production of items ordinarily produced in smaller machines at reduced cycles. This machine cuts labor costs, saves space, time and operating expense.

Incorporating the major features of the standard W-S "COMPLETELINE," this new unit includes many additional features engineered to assure a more efficient, profitable molding operation. To mention a few—its normal capacity (48 oz.) is increased 40-50% by an automatic stuffing arrangement. It utilizes a giant version of the W-S Heating Cylinder, known for its unusual record of near-capacity shots in such de-rating materials as styrene. The stainless steel hopper receives an entire barrel of material, which can be plasticized on automatic cycle at the rate of 200 lbs. per hour. Why say more?

Orders for 18 of these machines have already been placed. Let us tell you why leaders in the industry are rapidly adopting Model 48E-1000. A glance at the specifications gives one answer. However, write for Bulletin 620-F (with inserts) today, or, get in touch with our nearest representative for full details.

SPECIFICATIONS

Capacity of hopper	200 lbs.
Maximum feed	165 cu. in.
Maximum ounces per shot	48
Plasticizing capacity of cylinder per hour	200 lbs.
Speeds:	
Die Closing (Forward)	420 in. per min.
Die Closing (Return)	385 in. per min.
Injection (Forward)	160 in. per min.
Injection (Return)	210 in. per min.
Injection pressure	21,000 lbs. per sq. in.
Clamping capacity	1000 tons
Stroke of clamping ram	32"
Daylight opening	54"
Minimum die thickness	12"
Maximum die sizes	30" x 50"
Rated maximum power consumption of heat units	13 K.W.
Motor H.P.	60
Oil reservoir capacity	300 gals.
Floor space required	24'-6" x 4'-6"
Overall height	9'
Shipping weight	85,000 lbs.



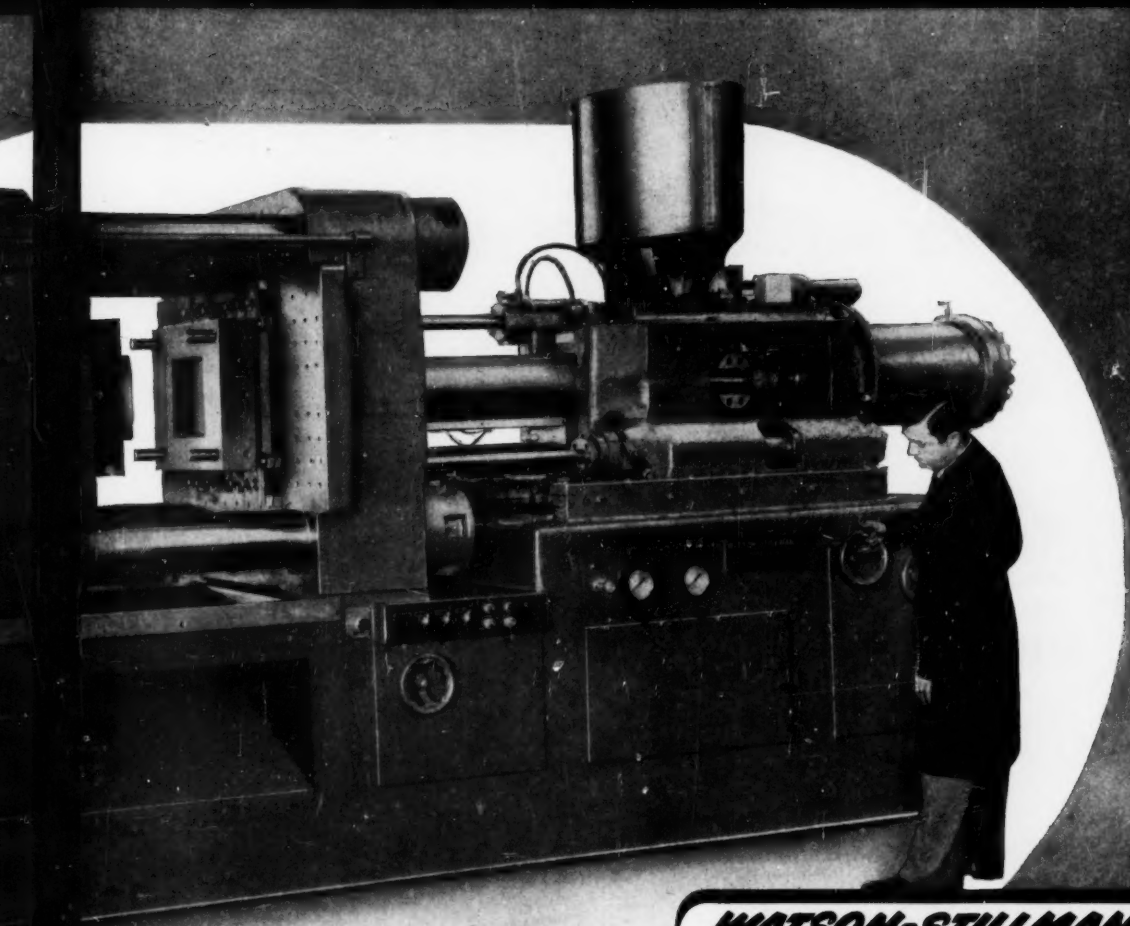
COMPRESSION MOLDING PRESSES
50 TO 1200 TONS

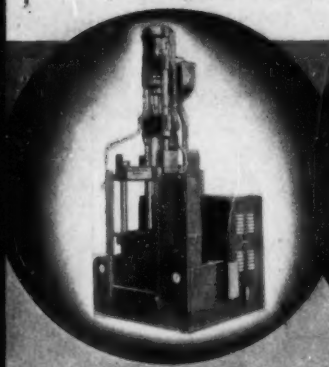
PREFORM TABLETING MACHINES
-80 AND 100 TONS

TRANSFER MOLDING MACHINES
30 TO 1200 TONS

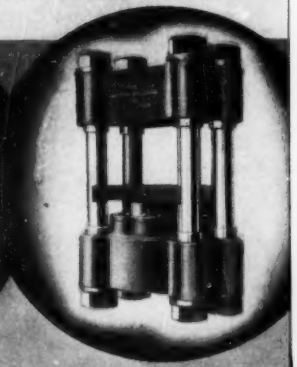
9-J-6

for BIGGER PROFITS with the INJECTION MOLDING MACHINE!





VERTICAL INJECTION MOLDING MACHINES—1, 2, AND 4 OUNCES



HOBBING PRESSES 200-3000 TONS

WATSON-STILLMAN
HYDRAULIC MACHINERY DIVISION

Established 1848

Factory and Main Office: Roselle, New Jersey
Branch Office: Chicago, Ill.

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Birmingham 3, Ala.	George M. Meriwether
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Correspondents Throughout the World
Manufacturers of the most complete line of Hydraulic Machinery

At the center of activity...

STUDEBAKER

USES A FUNCTIONAL DECORATION

IN ERIE RESISTOR

Three Dimensional Plastics

● This Studebaker horn button is a jewel . . . always in the driver's eye; it's a constant spur to pride in ownership, an unmistakable identification to admiring passengers. Erie Three Dimensional Plastics combine a depth and richness of color with a permanence that is untouched by wear, untarnished by time.

The design called for a high dome with heavy wall thickness, with gating possible only through the narrow wall section of the bottom of the flange. To produce the button without weld lines, air bubbles, or flow marks, which would vitally affect the quality during the painting and plating operations, accurate temperature control of material and die, and split-second timing of the molding cycle was essential.

Your plastics problems, whether of design or production, are in safe hands when you come to Erie Resistor.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND · · TORONTO, CANADA

A NIXON plastic adds distinction to a V.I.P.*

**V.I.P. stands for Very Important Product. Yours, of course.*

NIXON C/A (Cellulose Acetate) adds distinction to a line of bath brushes molded in one piece in a wide range of attractive colors by Progressive Plastics Company. Colors blend with any bathroom color scheme. Lightweight, chip-proof, virtually unbreakable, and yet designed to retail around one dollar. Another economical application of a Nixon Cellulosic. Consider one of these for your next molding or fabricating job. Nixon C/N (Cellulose Nitrate) in sheets, rods, and tubes . . . Nixon C/A (Cellulose Acetate) and Nixon E/C (Ethyl Cellulose) in sheets, rods, tubes, and molding powders. Ask for a copy of the Nixon catalog.

NIXON

CELLULOSIC PLASTICS

NIXON NITRATION WORKS • NIXON • NEW JERSEY

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COLDER COLD

NEW 1949 **WESTINGHOUSE** REFRIGERATORS DEPEND ON SPECIAL **BRIDGEPORT MOULDED** BAFFLES AND BREAKER STRIPS FOR IMPROVED COLD CONTROL

The last word in modern home refrigeration is truly "Westinghouse". New design plus improvements throughout results in the amazing new automatic Hold-Cold control that maintains colder cold in the freezers and steady temperatures in the food compartments.

One of the secrets behind this performance is special application of plastics. Bridgeport Moulded contributes to the success story by supplying Westinghouse with a special polystyrene baffle plate that helps control the all-important flow of cold air. The smart good looks of the new models are enhanced by the glossy breaker strip shown in illustration above.

These parts are injection molded at Bridgeport in extra-large capacity molding presses. Behind their success stand the years of experience gained in making highly specialized plastic parts for all phases of American industry. Perhaps we can help *you* make a better product. Write today to . . .

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

BOX 3276-O BARNUM STATION BRIDGEPORT 5, CONNECTICUT

LOW COST, BIG 20-OUNCE Injection Molding Machine

automatic time cycling molds large pieces fast... at low operating cost

The Windsor-20 has every improvement you want in an injection molding machine. It's accurate, fast-molding. It delivers sufficient power-packed injection pressure to mold the most intricate shapes, up to a full 20 ounces, even from hard flow plastic materials.

Every element of the Windsor-20 is precision made. Featured is a hydraulically operated retractable injection unit which brings the nozzle against the sprue bushing or away from the mold for sprue clearance or changing of material cylinders.

The high-grade alloy steel cylinder is fitted with three external band heaters, a nozzle heater and an internal heater. All are controlled by means of Energy regulators and three built-in pyrometers.

The Windsor-20 is designed and manufactured in Great Britain by one of the world's largest producers of injection molding machines, molds and dies.

If you contemplate increasing your injection molding capacity and desire the finest equipment available, additional details about the Windsor-20 will be of special interest. Write today for illustrated folder and detailed production data.

SPECIFICATIONS

Windsor-20 Injection Molding Machine with automatic time cycle control

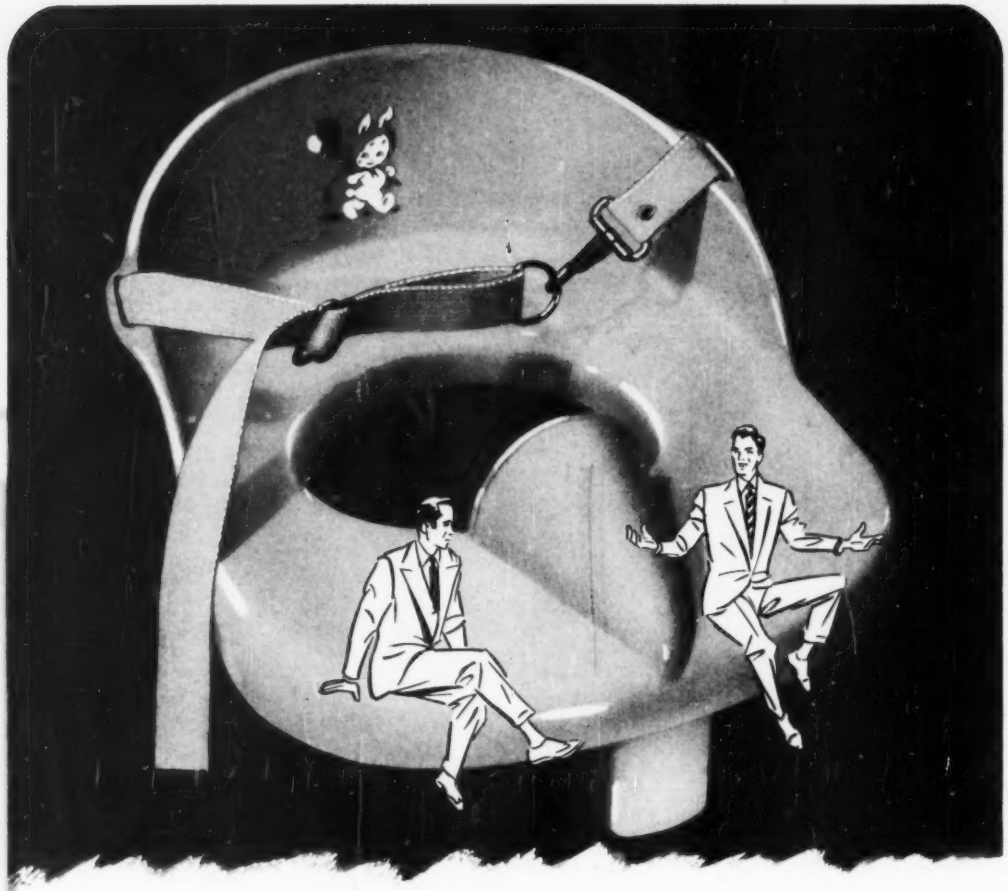
Die locking pressure	330 tons (English) 620 tons American
Maximum area molded	185 sq. in.
Plasticizing capacity	80-100 lbs. per hour (approx.)
Pressure on material	20,000 lbs. psi
Mold opens	17"
Maximum mold thickness	20"
Die plates	34" x 38"
Ounces molded per shot	20 ounces 562 grams (approx.)
Main motor	55 hp
Locking mechanism	multiletcad toggle
Weight	18 tons (approx.)
Floorspace	22' x 4'6"

R. H. Windsor Ltd.

16 FINSBURY SQ. LONDON, E. C. 2 ENGLAND

Cables: TECHNIMACH LONDON

PLASTIC MACHINES



Let's get to the **seat** of your problems!

WE MEAN — SALES! *YOUR* SALES! *MORE* SALES! Why? Because we are not exclusively custom molders of plastics . . . but mass merchandisers of plastics products in our own right.

That's why our own "John-ee" Baby Training Seat has startled the market . . . by its *unprecedented* selling features . . . by its *unprecedented $2.98 retail price* . . . by its *unprecedented high sales!*

We engineer sales success into our own plastics products. *Let us do it for yours!* Columbia's practical, price-conscious, market-wise viewpoint guides our technical skills, our production facilities. An opportunity to do custom molding for you is an opportunity to mold customers — FOR YOU! Inquiries invited.

Columbia

COLUMBIA PROTEKTOSITE COMPANY, INC., CARLSTADT, NEW JERSEY
New York Showrooms: Empire State Building

Edge Lighted Sign, Molded for Roger M. English & Associates, Chicago

Plastics Produces a Sure Sign of Salesmanship

Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about "Tenite-Butyrate" pipes, tubing and fittings, write for circulars containing data and illustrations.*

**Trademark Registered*

Put a sign in a store window and watch the customers gather—that is, if the sign is this one which we molded for Roger M. English & Associates, Chicago. Producing eye appealing displays such as this is but one phase of our many sided plastics molding skill.

Whether yours is a product for rugged industrial use—or an exquisitely styled feminine object—we can mold it to your greater satisfaction in our ultra-modern new plant. What's more, our precision craftsmanship and proper use of correct plastic materials assures you of better plastic products.

Our greater new facilities backed by richly varied molding experience are at your service. Let us help you solve your plastic problems without obligation.

ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Lucite, Nylon, Ethyl Cellulose, Plexiglas, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Forticel, "Tenite-Butyrate"*, Saran, and other Thermoplastic Materials.

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

Behind the mask of

"Madame X"...

a Plastic Cabinet molded by **MPc** *for* **RCA Victor**

Today every record collector knows about RCA Victor's sensational new 45 RPM phonograph records. But during ten years of research and experimentation, news of this important development was concealed by the code name "Madame X."

MPc helped to prepare "Madame X" for her public debut. A new type of record player was needed for the new records...a dependable, attractive player at an inviting low price. **MPc** assisted in the development of this player by supplying cabinets of sleek, sturdy, handsome, *low-cost* plastics.

When it comes to new product development, look to **MPc** for practical help. Or let us quote on efficient production of your standard molded parts or products. Submit samples or blueprints to MOLDED PRODUCTS CORPORATION, 4535 W. Harrison St., Chicago 24, Illinois.

PLASTICS DIVISION

MOLDED MPc PRODUCTS

CORPORATION

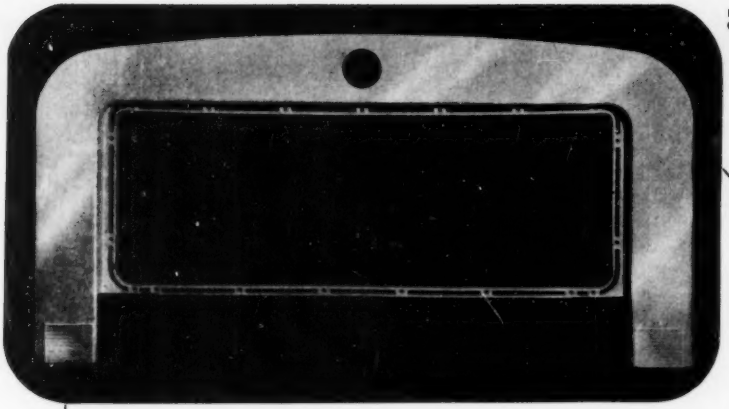


Photo courtesy of
Celanese Corporation of America

new pastel tints
color-engineered for refrigerator parts
depend on

TITANOX
PIGMENTS

The plastic housing for the freezing compartment of a popular refrigerator was styled to take on a newly-created "Apricream" shade.

To successfully achieve this tint, TITANOX pigments were chosen on account of their high strength and clarity — and most important of all — permanence of color.

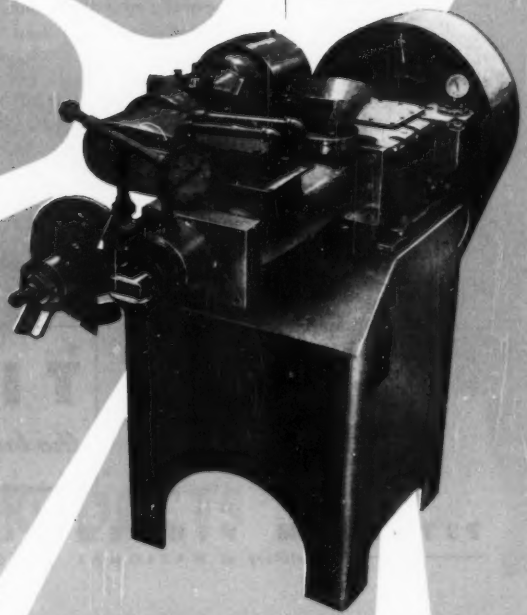
Whenever you want to impart whiteness or clarity of tint . . . brightness and opacity to *any* type of plastic, let our Technical Service Laboratory help you select the titanium pigment that best suits your needs. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 So. Michigan Ave., Chicago 3, Ill.; 2600 So. Eastern Ave., Los Angeles 22, Calif. Branches in all other principal cities. 7332

TITANOX
the brightest name in pigments

TITANIUM PIGMENT CORPORATION
Subsidiary of NATIONAL LEAD COMPANY

NOW...ALL FOUR ONE MACHINE!

COMPOUNDS · EXTRUDES · RECLAIMS SCRAP · PELLETIZES



OPERATIONS ON

It's the amazing Compounder-Extruder*—and its tremendous advantages will be immediately apparent to every molder and extruder. Here is a single, compact machine, operating on entirely new principles, that does all the jobs generally performed by four separate types of equipment.

Because Compounder-Extruders are obtainable in five sizes, you are certain to find the model whose output meets your need. The smallest has an average compounding and extruding capacity of 100 pounds per hour, while the largest will turn out as much as 2000 pounds hourly.

Injection molders will find that the Compounder-Extruder produces completely compounded injection molding pellets from raw materials . . . into the hopper at one end go the resins, fillers, plasticizers and colorants and out at the other emerges a uniformly pelletized 100 per cent compounded mixture ready for immediate use in injection molding machines.

Extruders will find that the Compounder-Extruder slashes raw material costs and eliminates completely the need for maintaining costly inventories of numerous odd lots of special formulations. They will find that the Compounder-Extruder will both compound and extrude in a single pass and that henceforth they will need only to stock a few varieties of uncolored raw materials instead of the welter of odd lots presently required.

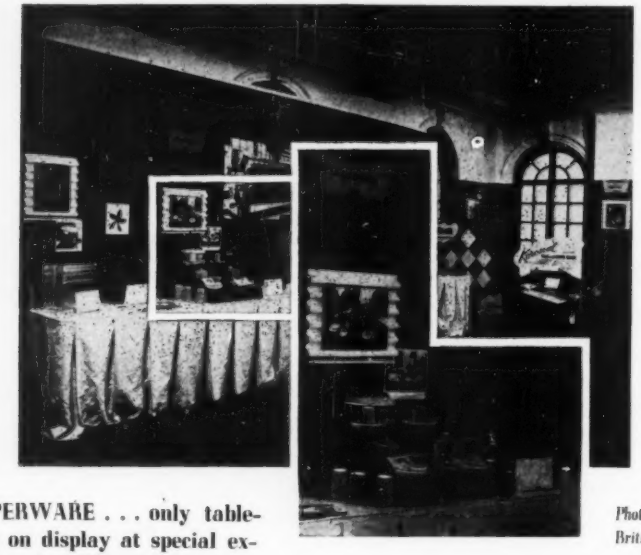
In addition to compounding, extruding, or pelletizing, the Compounder-Extruder *solves your scrap problem.* Strips, strands, rods, odd cross sections, or what have you, may be fed into the hopper. Grasped by the counter-rotating dual worms, the material is pulled into the barrel where it is plasticized and pelletized, ready for further processing, or extruded into a finished shape if so desired.

The Compounder-Extruder gives plastics processors an unparalleled opportunity to make major reductions in overhead, raw material, and processing costs. From the compounding of virgin materials to the reclamation of your scrap, you are assured of quality and quantity output. We urge you to write now for full specifications, prices and delivery dates of the Compounder-Extruder.

ADDRESS YOUR REPLY TO

*Patents issued and pending

machinery division
WELDING ENGINEERS, INC.
NORRISTOWN, PENNSYLVANIA



TUPPERWARE . . . only tableware on display at special exhibition in Iliffe & Son, Ltd., London, England. Also similarly displayed in Paris, France.

Photo Courtesy British Plastics

TUPPER TUPPER!

an assurance of confidence-a pledge of good faith

In England; in France; in Holland and Belgium . . . in the homes of hundreds of thousands of American women from the rock bound coasts of Maine to the sun kissed shores of California, Tupper products, fashioned of Poly-T (trade mark) "material of the future" carry the guidon of leadership.

Tupperware, exquisitely designed and made in softly translucent pastel tones grace the tables of homes all over the world; other Tupperware pieces contribute new and amazing convenience in the preparation of meals and the storing of foods in anticipation of and following those repasts.

Tupper specially designed and manufactured units add to the saleability and more satisfactory use of such articles of world renown as American Thermos Bottles.

Tupperware table and kitchen pieces such as Tupperware Refrigerator Bowls are employed for the more attractive packaging of such delicious edibles as Red Rooster natural cheeses. And always, constantly, new developments; new pieces are being conceived and made available for household, industrial, packaging and scientific uses.

One of the most recent of these is Poly-T continuous film and sheeting 96" wide and 1½ mils in thickness and up for all accepted film purposes such as packaging, industrial and scientific applications; for tubes, bags, drapes, curtains; the largest sizes of bed spreads, table cloths, slip covers.

The highly successful and broadly known application of Tupper products to so many services would seem to indicate that this name should be considered most seriously among those contemplating new and more aggressive approaches to changing and increasingly "finicky" markets. Could be that here would be found, or developed, that which would transform mediocrity into outstanding achievement.

TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas

New York Show Rooms 225 Fifth Ave.

ADDRESS ALL COMMUNICATIONS TO: Department D

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WANTED:

. . . *A Moulded Resin Fibre preform Product* to encase chassis of famous Motorola Portable Radio. Must be strong, yet light in weight. Must withstand severe usage under various conditions — must have basically sound styling involving difficult contours — smart in appearance, yet economical to meet price competition.

All the above specifications have been technically and artistically fulfilled in the production of the popular Motorola Portable Radio illustrated. . . Hawley's "know-how" — the impact qualities of Hawley Moulded Resin Fibre preform Products — the flexural characteristics — the solution of difficult contours — all these are the fundamental technics that have made the new Motorola Portable Radio a sensation in the highly competitive Radio field — a beautifully encased Radio that is "wanted" and welcomed enthusiastically by the purchasing public.

LICENSING MANUFACTURERS

MOULDED FIBRE PRODUCTS

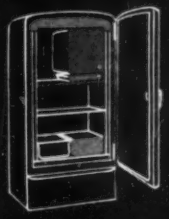
Hawley

RESIN FIBRE PLASTICS

PRODUCTS COMPANY

SYDNEY, AUSTRALIA . BRANTFORD, CANADA . . LONDON, ENGLAND . . BUENOS AIRES, S. AMERICA

Executive Offices
ST. CHARLES, ILL.



A FEW OF THE ITEMS GENERAL AMERICAN MOLDS FOR MANY INDUSTRIES:

Agitators for washing machines
Air Circulators
Airline Trays
Brush Holders
Business Machine Housings
Chairs
Cheese Containers
Contact Blocks
Control Panels
Cosmetic Cases
Dinnerware
Electric Iron Handles
Escutcheons
Fan Housings
Fishing Tackle Boxes
Freezer Lids
Instrument Panels
Key Holders
Luggage Trays
Machine Wheels
Radio Cabinets
Refrigerator baffle assemblies, breaker strips, coil door covers, crispers, drip pans
Record Players
Salt & Pepper Shakers
Scale Housings
Silverware Trays
Television Cabinets
Timing Case Housings
Training Seats

Many of America's best-known manufacturers call on General American to develop and produce successful plastics parts and products. They depend on General American's many years of precision production experience. They benefit from the use of the most modern equipment available—2 oz. to 48 oz. injection presses and 100 ton to 2000 ton (71" x 74" platen areas) compression presses.

When plastics can be used, General American can serve you from engineering to delivery.

PLASTICS?

PLASTICS DIVISION GENERAL AMERICAN TRADE MARK

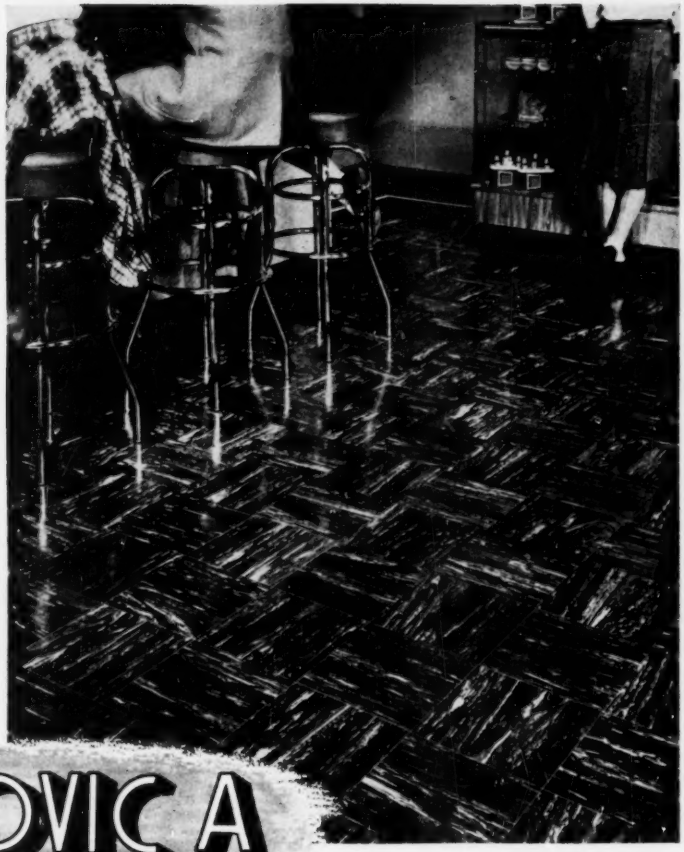
See General American

PLASTICS DIVISION • GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle St. Chicago 90, Illinois

NEW YORK—10 EAST 49TH ST. • LOS ANGELES—RICHFIELD BLDG.

Pliovic A can be used alone or to improve processing in existing formulations to turn out attractive, durable flooring like this.



for TOUGH, LONG-WEARING FLOORING

use

PLIOVIC A

FLOORING in a wide range of colors — both solid tone and multi-color — and unrivaled for long wear and toughness can be made using **Pliovic A. Pliovic** is the new vinyl chloride-type copolymer with superior processability due to its lower fusing temperature and more efficient internal plasticization.

Pliovic A can be easily calendered for low-cost production of a beautiful, durable surface. It needs less plasticizer than copolymers of comparable molecular weight. It has high strength, excellent resistance to flex-fatigue, toughness at low temperatures, outstanding age and light stability, and chemical resistance.

In addition to **Pliovic A,** ask about **Pliovic AO** — with comparable properties but designed for use in organosols. Write for further details to:

Goodyear, Chemical Division
Akron 16, Ohio.

USE PROVED *Products*

GOODYEAR

Pliovic—T.M. The Goodyear Tire & Rubber Company

THERMALL ELECTRONIC HEATING EQUIPMENT

Announces

NEW PLASTIC PREHEATER

MODEL "67"

PORTABLE

COMPACT **(27" x 34" Floor Area)**

HEATABILITY **6 to 7 Pounds in 1 Minute**

Model "67" is a result of several years engineering and development in plastic preheating equipment. Designed to handle large or small loads of compound either as a general purpose preheater or on multi-cavity compression jobs where a loading board can be used to advantage. A new high in operating performance and efficiency is attained by this unit, the latest offering of THERMALL engineering.

"GUARANTEED PERFORMANCE — *or it doesn't cost you a cent"*

Check These Specifications of the THERMALL "67"

WIDTH	34 inches
DEPTH	27 inches
HEIGHT	56 inches
WORK LEVEL	32 inches
WEIGHT	1000 pounds

CONSTRUCTION: Angle steel frame encased with heavy gauge sheet, equipped with heavy duty rubber wheel swivel casters. Finish: Durable gray wrinkle paint.

POWER REQUIRED: 220 volts, or 440 volts, 60 cycle, 3 phase, A.C. (Specify on your order.)

REGULATED FILAMENT VOLTAGE

POWER TUBES: 2 — #25X THERMALL.

RECTIFIER TUBES: 6 — #67 THERMALL.

HEATABILITY: 6 to 7 pounds per minute.

TIME CONTROL: Dual automatic electric resetting to select time interval — from 0 to 3 minutes, by seconds.

ELECTRODE AREA: 20" x 26".

MAX. COMPOUND CAPACITY: 15 to 20 pounds.

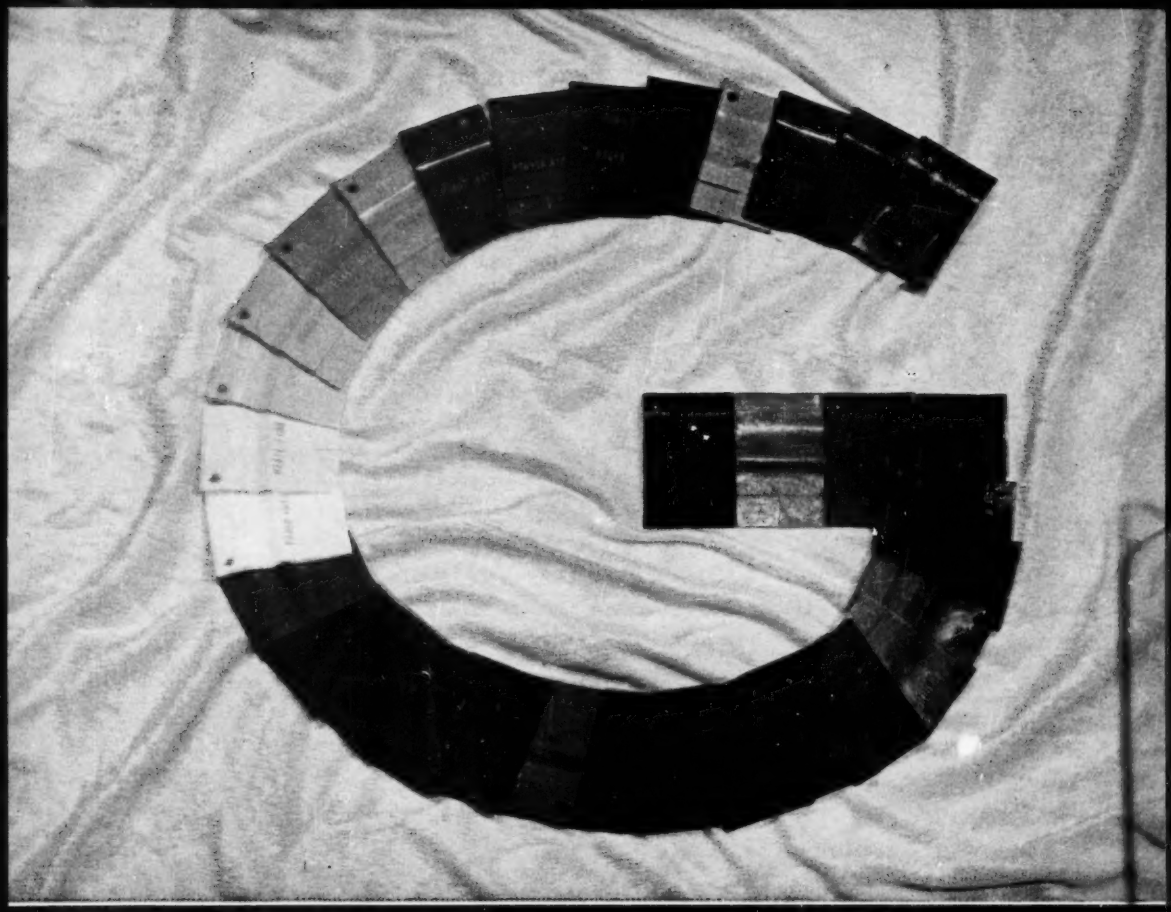
SAFETY: Dual safety interlock switches protect operator electrically and mechanically.

ARRANGE TO SEE THE "67" PERFORM

10 REASONS WHY THE THERMALL "67" CAN HELP INCREASE YOUR PROFITS

1. Cuts Your Molding Time 50% — or More.
2. Cuts Down Rejects and Mold Repairs.
3. Makes "Difficult" Compounds Easier to Handle.
4. Lets You Use Lower Press Operating Pressures.
5. Cuts Down the Number of Molds You Have to Build.
6. Operated by Anyone.
7. Low Tube Cost.
8. No Costly "Maintenance" Problem.
9. Adaptable to Hundreds of Jobs.
10. Low First Cost — Negligible Operating Cost and Long, Heavy Duty, Trouble Free Performance.

W. T. LA ROSE & ASSOCIATES, INC.
TROY, N. Y. U. S. A.



Facilities behind GP symbol

Twenty-seven years ago, Gering Products Inc., Prime Producers . . . Custom Converters of Molding Powders was founded . . . Through the years GP Molding Powders, produced under rigid analytical control, have set a high standard of quality . . . Colored in every hue of the spectrum, GP specially lubricated Molding Powders feature . . . uniformity of color . . . easier molding . . . quicker molding cycles . . . adaptability to mass production with less rejects . . . Backed by production on a large scale and coupled with technical resources, research and sales departments which offer practical service and assistance on all problems in the use of Molding Powders, GP has been accepted through customer satisfaction and by their continued maintenance of Quality . . . Service . . . Dependability.

"Gering engineering makes fine plastics better"

GP

PLASTIC MATERIALS

GERING PRODUCTS, Inc.

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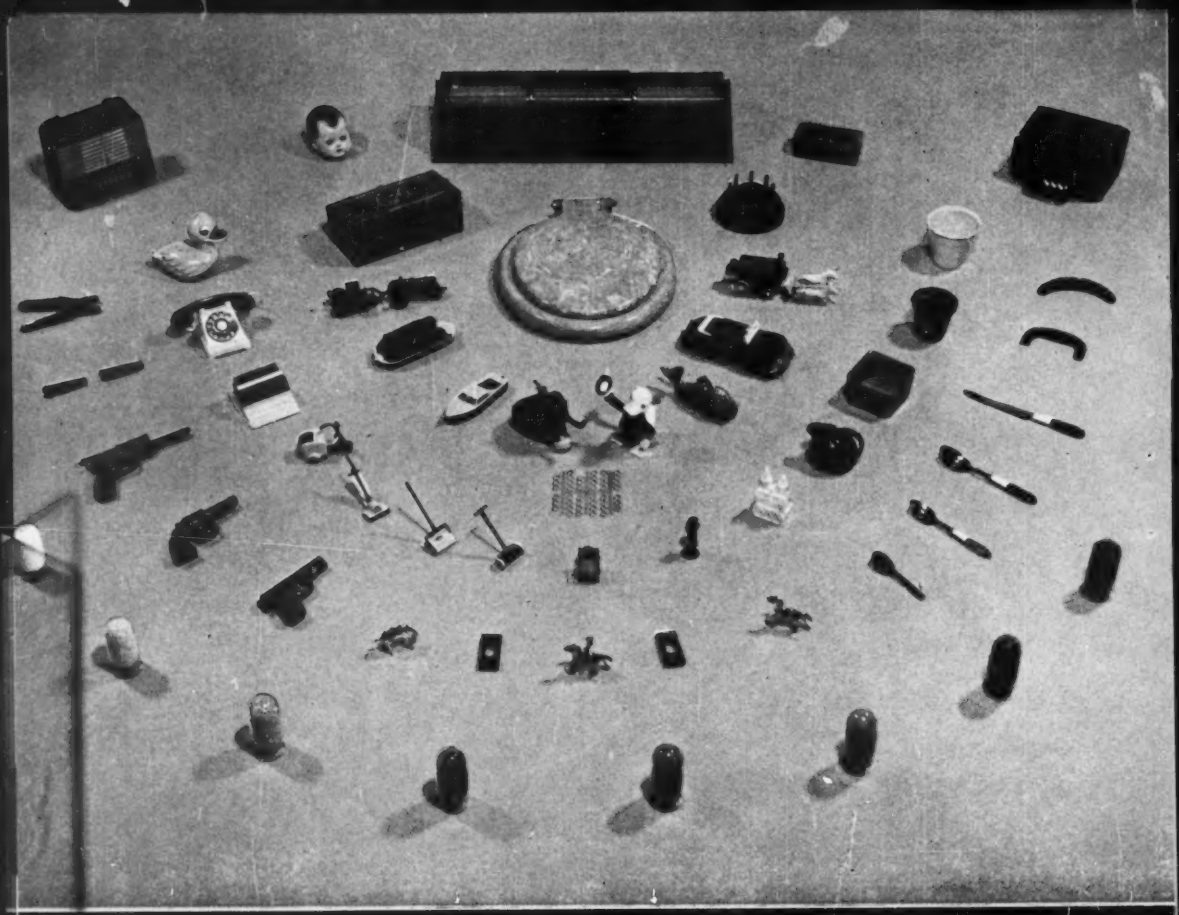


GERING CREATES A Legend IN COLOR

Gering molding powders have created a legend of customer satisfaction throughout the world, because of their rigid quality control . . . uniformity of color, and faster molding cycles.

GP by analyzing the "end result" desired . . . selects material and process, then efficiently and economically produces the required powder or color for your molding problem.

"Gering engineering makes fine plastics better"

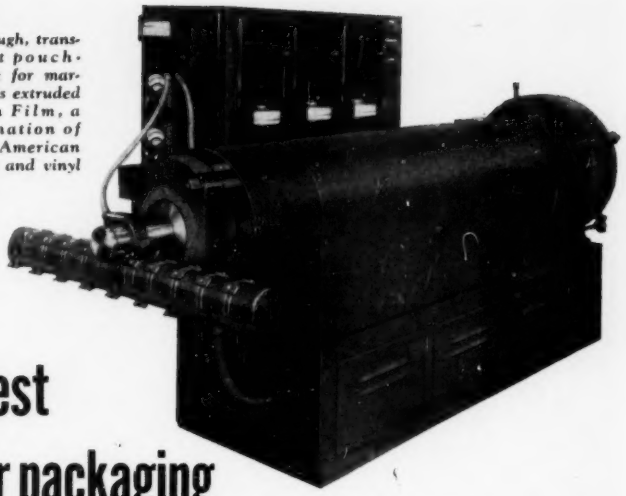
GP

PLASTIC MATERIALS

GERING PRODUCTS, Inc.

CABLE ADDRESS: GERING KENILWORTH, N. J.

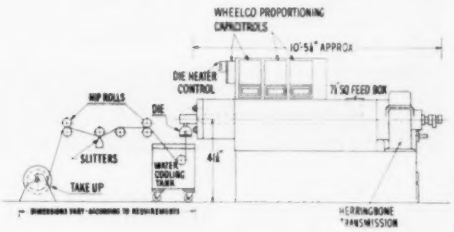
This tough, transparent pouch-package for margarine is extruded Visten Film, a combination of Hycar American Rubber and vinyl resin.



World's finest film and sheeting for packaging

produced by NRM extruders

The NRM 4½" All-Electric Extruder equipped with T-type polyethylene die for the extrusion of 40" wide film, shown here, is designed for fast, efficient production of the larger cross-sections in materials with extremely high extruding temperatures. The unit has a capacity up to 300 lbs. per hour.

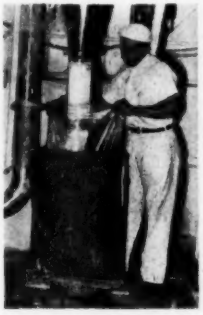


WITH the emphasis on thermo-plastics *extruded* materials for packaging purposes, NRM is serving the plastics industry all over the world, with a full line of extrusion equipment designed to meet the most exacting requirements in the production of thin-wall film and thin-gauge sheet.

If you've been waiting for a practical, *low-cost* method of thermo-plastics film or sheet production for use in packaging, contact us—today!

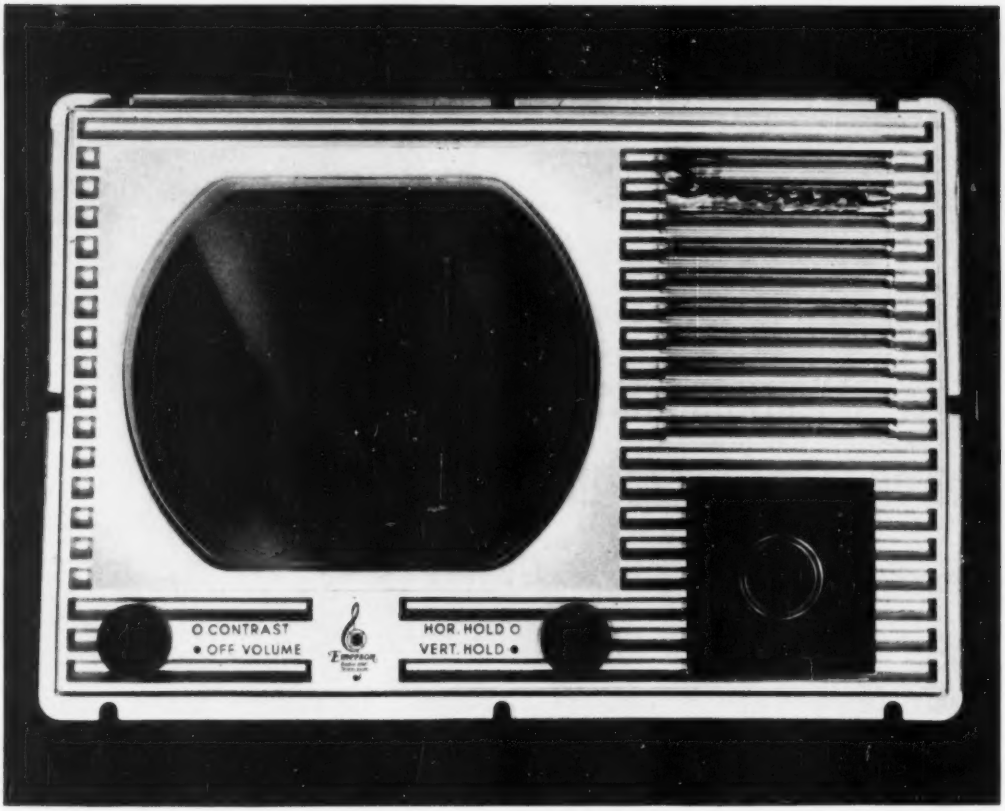
Visqueen clear film, produced with NRM Extrusion Equipment, displays attractive home products to best advantage.

Filling extruded Visqueen film-lined bag with powdered milk. In test, bag opened 9 months after sealing showed no trace of lumping.



NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 8, OHIO
Export Representative for Plastics Extrusion Equipment
OMNI Products Corporation, 460 Fourth Ave., New York 16, N. Y.

Plastics
MACHINERY DIVISION



CREATIVE CUSTOM MOLDING

The television escutcheon illustrated is currently being produced for Emerson Radio & Phonograph Corporation, of New York.

It is a complete television front and grille, providing for the television screen, speaker assembly, and control accessories.

CRUVER has been furnishing television fronts for the radio industry for over 2½ years. They are injection molded in clear acrylics and decorated on a production basis in our finishing department.

Whether your requirements are large or small — check with CRUVER and take advantage of our years of experience in decorative plastics.

CRUVER MFG. CO.

Est. 1896

MOLDING • FABRICATING • LAMINATING • FINISHING
"BAS-RELEEF" • DECORATING • ASSEMBLY • SPRAYING

2460 WEST JACKSON BLVD., CHICAGO 12, ILLINOIS

NEW YORK 2 West 46th Street | DETROIT General Motors Building | ST. LOUIS Cotton Belt Building

Tests show Marvinol® saves time... improves quality in making plastics

In laboratory tests and production runs, Marvinol vinyl resins are proved time-savers due to shorter pre-mix, open mill and Banbury cycles . . . faster extrusion cycles.

IN ADDITION TO TIME-SAVINGS in processing, Marvinol offers many important benefits to processors, fabricators, marketers and consumers. Products based on Marvinol vinyl resins have greater flexibility at low temperatures . . . less deformation due to heat. They're extra tough, dry and pleasant to touch. They resist oils, acids, wear, tear and abrasion.

High processability spreads these benefits to many varied fields, for Marvinol can be calendered, extruded, injection-molded or dispersed for coating and slush molding . . . in rigid, semi-rigid or elastomeric formulations . . . Test this remarkable vinyl polymer. Chances are, if you're a processor, it will pay you in time-savings and quality . . . and if you make end products it will increase the salability of your merchandise.

The entire efforts of our modern development laboratories are for our customers' benefit. All the formulation, compounding and processing information developed here is at your disposal since it is only through you that Marvinol-based products reach the consumer market. Write to Chemicals Division, Dept. M-9, THE GLENN L. MARTIN COMPANY, BALTIMORE 3, MARYLAND.

Marvinol's extra toughness and dryness make plastics products more durable with a surface that's pleasant to touch.

• • •

Marvinol's greater flexibility in low temperatures pays off in products subjected to severe exposure and cold weather during shipping or use.

• • •

Superior dimensional stability makes Marvinol vinyl resin an ideal raw material for products that must not shrink or deform under heat and time.

Martin Marvinol

RESINS, PLASTICIZERS AND STABILIZERS PRODUCED BY THE CHEMICALS DIVISION OF

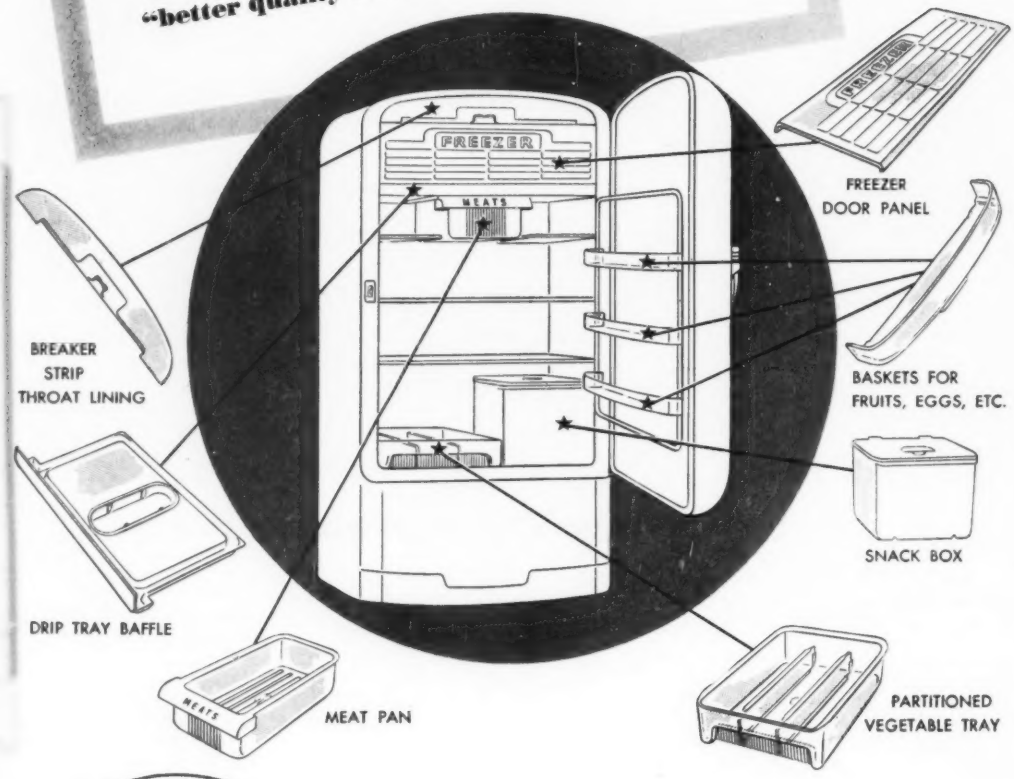
THE GLENN L. MARTIN COMPANY • AN INTERNATIONAL INSTITUTION

"BETTER PRODUCTS, GREATER PROGRESS, ARE MADE BY MARTIN"

MANUFACTURERS OF: Dependable Martin 2-0-2 airliners • Advanced military aircraft • Revolutionary rockets and missiles • Electronic fire control systems • Versatile Marvinol resins (Martin Chemicals Division) • **DEVELOPERS OF:** Marong fuel tanks (licensed to U. S. Rubber Co.) • Stratovision aerial rebroadcasting (in conjunction with Westinghouse Electric Corp.) • Honeycomb construction material (licensed to U. S. Plywood Corp.) • New type hydraulic automotive and aircraft brake • Permanent fabric flameproofing • **LEADERS IN RESEARCH** to guard the peace, build better living in far-reaching fields.

BETTER MOLDINGS CAN MAKE YOURS A BETTER PRODUCT, TOO!

Leading Manufacturers (Frigidaire, Crosley, Norge, Philco, Westinghouse, Montgomery Ward) know the advantages of Prolon's "better quality . . . better service".



For better quality, better service, write to

PROLON PLASTICS

COMPLETE CUSTOM MOLDING SERVICE

Research • Design • Engineering • Die Making

COMPRESSION AND INJECTION

A Division of Pro-phy-lac-tic Brush Company, Florence, Mass.

YOU GET A

DOUBLE FEATURE

WITH

VARCUM RESINS

Got a resin problem? Here at Varcum we realized long ago that no two manufacturers have identical resin problems. Consequently, Varcum gives INDIVIDUAL and CONCENTRATED ATTENTION to your problem until it is solved.

Once you've okayed our solution and placed an order for that particular Varcum Resin, you can re-order with complete confidence, for Varcum's well-known UNIFORMITY OF PRODUCTION gives you the same outstanding results time and time again. Next time you need a phenolic resin, get the Varcum Double Feature! Get Individual Attention for your problems plus the Uniformity of Production that assures consistent quality for your product.

VARCUM CHEMICAL CORPORATION

NIAGARA FALLS, NEW YORK

When you select MPM Extrusion Equipment you're buying much more than merely machinery

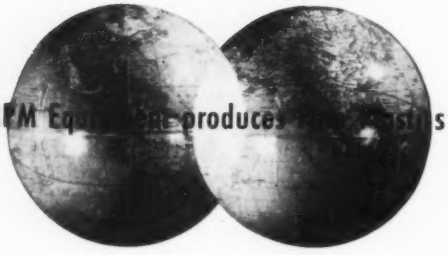
UR FOREIGN OR DOMESTIC CUSTOMERS, in any of the seventeen countries listed below, would advise that they are completely satisfied with the performance of Modern Plastic Machinery extruders, conveyors, drying cabinets, granulators, monofilament spoolers and other machines. Here are the reasons why—

REASON #1 — Foremost reason for customer satisfaction with MPM equipment is the completeness of the operating instructions available with each unit. In many instances, customers who have never previously operated plastics equipment are now in full scale production, having based their operations solely on the know-how supplied by MPM. In other terms, MPM has instructed them, in many cases, how to extrude all sorts of shapes, cross sections, films and wire coverings. MPM has given them thorough details about temperatures, screw speeds, take-ups and the like for the specific extrusions in which they are interested.

REASON #2 — MPM extruders and other units come *ready to run.* No extras are needed. Hopper, heating elements, even dies, when ordered, are supplied with each machine. Since every MPM extruder gets a full trial run prior to shipment, all that need be done is attach a water line and an electric supply line and begin production. What's more, no special flooring or foundations are required.

REASON #3 — To give maximum service, MPM extruders are made of corrosion resistant materials through and through. Cylinders are electrically heated, but may also be cooled or heated with steam, air or water. Frictional heat can be removed from cylinders by using any of the 9, 11 or 15 radial cooling zones provided (depending on screw size). In addition, because MPM extruders are so extremely versatile, they may be used for many kinds of extruded products—rods, channelling, garden hose, belting, covered wire (up to 50 mm.), films to 100" wide, thin tubing, monofilaments, flat sheeting, brush bristles, injection molding pellets, etc. These machines are in constant use extruding Nylon, Polyvinyl Chloride, Polyethylene, Polystyrene, Methyl Methacrylate, Acetate, Formvar, Kel-F, Ethyl Cellulose, etc.

High production MPM extruders come in the following sizes: 1¼", 1½", 2", 2½", 3½", and 4½". MPM also supplies all the equipment needed for complete extrusion plants, including dies and *know-how.* Tell us what you want to extrude and we'll rush detailed information about the MPM equipment to do the job, if we have it. Write without delay.



MPM Equipment produces Plastics Extrusions the World over

Argentina
Australia
Brazil
Canada
China
England
France
Greece
Holland
India
Israel
Mexico
Portugal
Sweden
Switzerland
United States
Uruguay

modern plastic machinery corp. mpm

15 UNION ST., LODI, N. J.

CABLE ADDRESS MODPLASEX

CABOT CARBON BLACKS *for Black Plastics*

for POLYVINYLS	**Supercarbovar** **Monarch 71**
for POLYETHYLENE	**Carbolac 2** **Supercarbovar**
for BLUE-BLACK, LOW ADSORPTION FILLER IN ALL PLASTICS	**Sterling R**

Intermediate grades available to meet other quality-price specifications.

WRITE TODAY FOR CABOT'S TECHNICAL BULLETINS

CABOT

CABOT CARBON BLACKS IN POLYETHYLENE

CABOT CARBON BLACKS IN POLYVINYL PLASTICS

77 FRANKLIN ST.
BOSTON 10,
MASSACHUSETTS

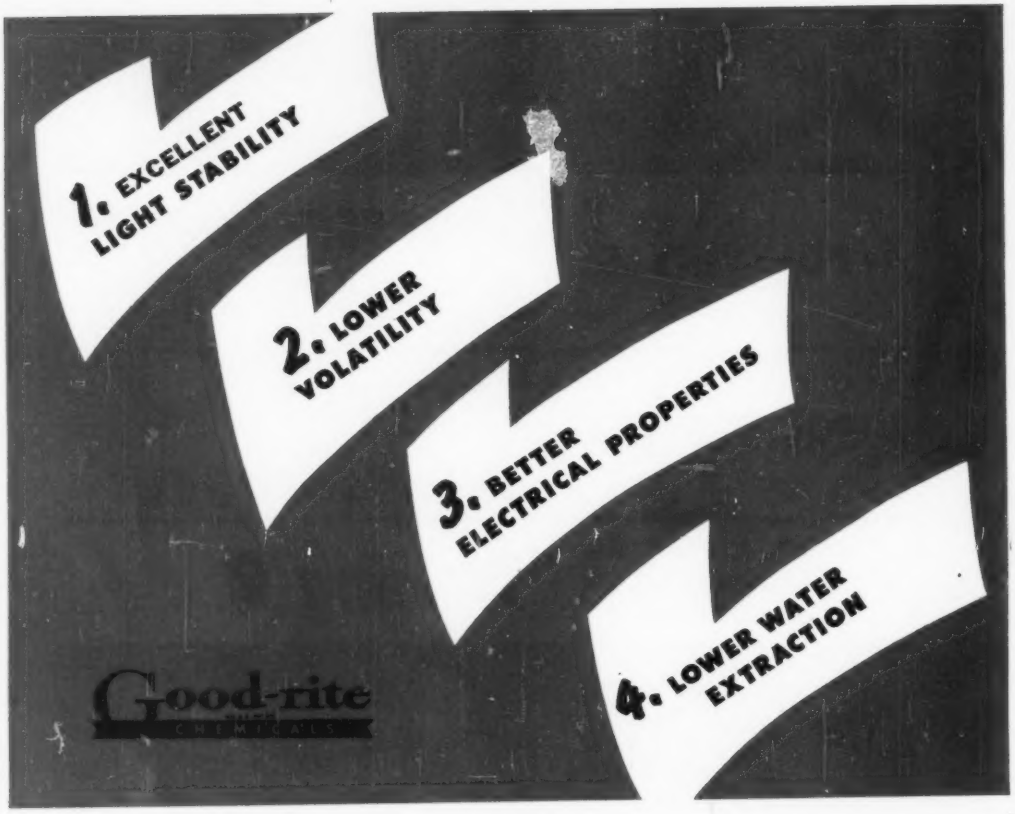
GODFREY L. CABOT, INC.

Check list of advantages

Good-rite plasticizer GP-261

Reg. U. S. Pat. Off.

This better balanced dioctyl phthalate plasticizer, because it is made by a distinctly new process, offers:



AS a primary plasticizer for vinyl and other synthetic resins as well as for nitrile type rubber, GP-261 adds values for many product applications.

For example, GP-261 teams with Geon resins in making quality film and sheeting, insulation for wire and cable, and many more consumer and industrial products.

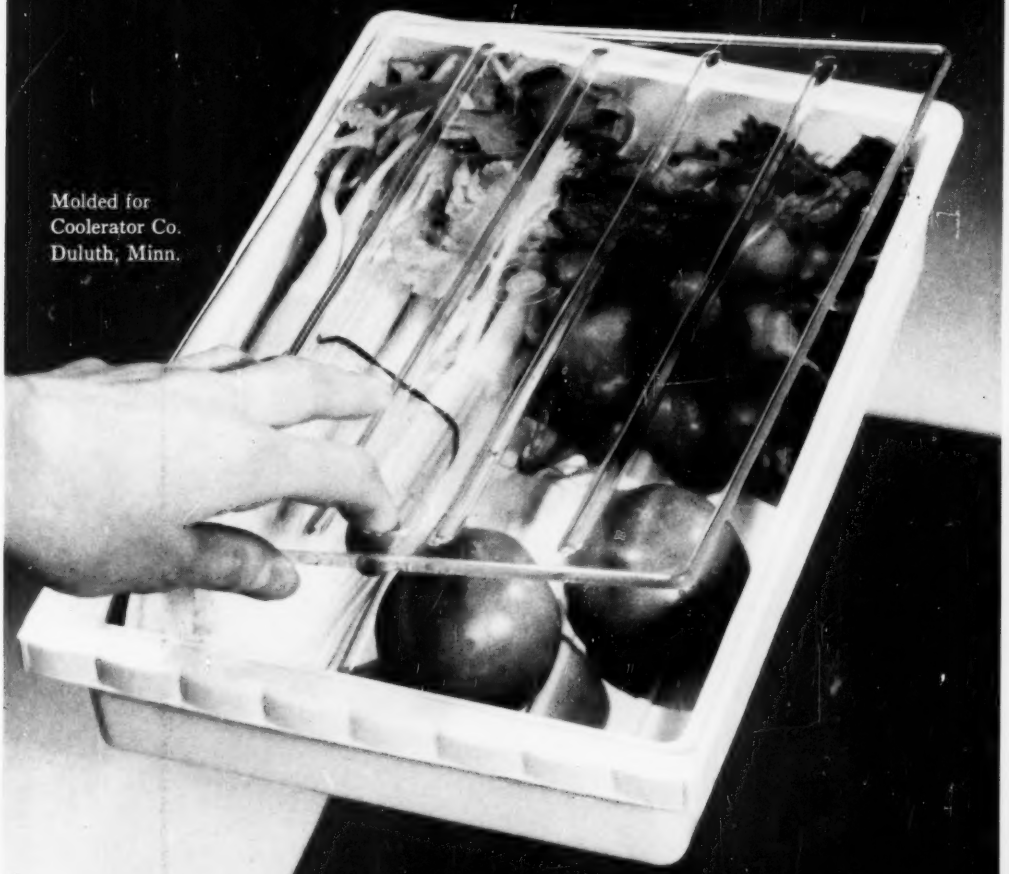
New production facilities assure ample supplies of Good-rite plasticizer GP-261. For complete information, please write Dept. SN-9, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio.

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

Visible Freshness + Extra Convenience!



Molded for
Coolerator Co.
Duluth, Minn.

This new utility tray entirely of Polystyrene to fit in different parts of the refrigerator is an extra feature by Coolerator, and extra fine molding by MINCOR.

Consult us about your injection molding needs.

INJECTION MOLDING
MINCOR
YOUR PLASTICS DEPARTMENT

MINNESOTA PLASTICS CORP.

366 WACOUTA • ST. PAUL 1, MINN.

. . . . . Your Engineering

FOR PLASTICS NEEDS AMOS INGENUITY

Amos ability to engineer for *economical* production . . . and to cooperate personally with you in product development insures satisfaction of a *quality* job where plastics must *SELL*.

Economy comes with doing a job *right* . . . from the beginning. Call the Amos product engineer *first*. He is the top man in his field, one with whom you'll enjoy working.

So that we'll work together better, learn in advance what to expect of us. Write for our new 52-page booklet illustrating Amos facilities . . . and picturing in full-color sales and engineering ideas developed by Amos for every industry.

AMOS MOLDED PLASTICS

Division of Amos-Thompson Corp.

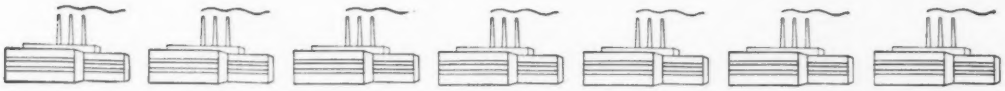
Edinburg, Indiana

Product development and molding for Eureka-Williams Corporation. An illustration from the new 52-page Amos booklet.

Amos MOLDED PLASTICS

Custom molders of *quality* plastic parts and products • Injection molding specialists

behind this trusted trademark are seven WITCO plants...



WITCO owns and operates seven modern chemical manufacturing plants that stretch from Perth Amboy, New Jersey, to Texas.

Thoroughly trained operators, highly specialized research and technical service staffs all cooperate to produce the highest possible quality chemical products for the plastics industry:

CARBON BLACKS
METALLIC SALTS OF FATTY ACIDS
- BARIUM STEARATE
- CADMIUM STEARATE
- CALCIUM STEARATE
- LEAD OLEATE
- LEAD STEARATE
- LITHIUM STEARATE
- MAGNESIUM STEARATE
- ZINC STEARATE

MONTY WAX
As well as many others.

Tell us your requirements, then . . . count on WITCO.

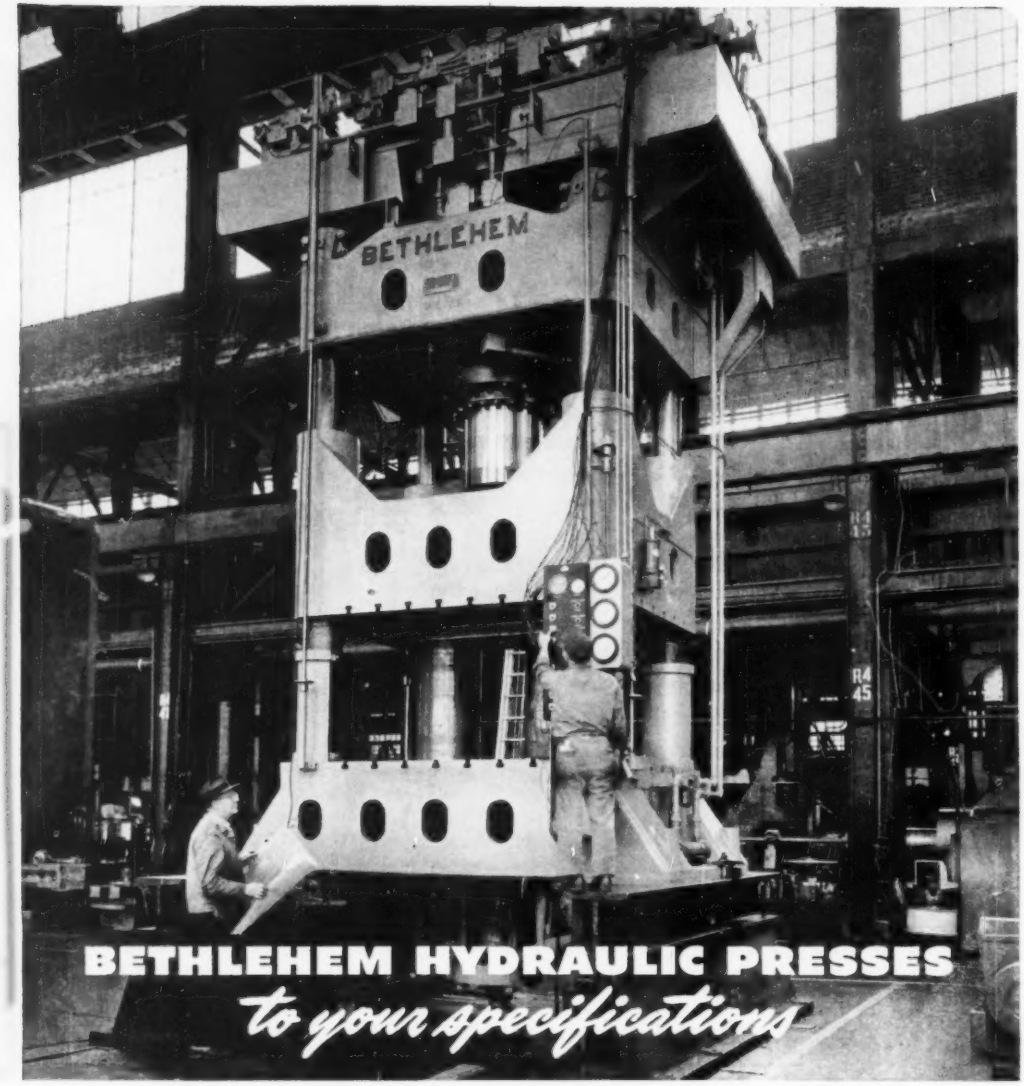
YOU KNOW THAT WITCO MAKES HIGHEST QUALITY PRODUCTS

WITCO CHEMICAL COMPANY

MANUFACTURERS AND EXPORTERS

295 MADISON AVENUE, NEW YORK 17, N. Y.

LOS ANGELES • BOSTON • CHICAGO • DETROIT • CLEVELAND • SAN FRANCISCO • AKRON • LONDON AND MANCHESTER, ENGLAND



When you select Bethlehem to build your hydraulic press, you gain the advantages of a complete, integrated service that covers all phases of the work, from the engineering to the final testing and shipping. Bethlehem is equipped to do the *whole* job, including the making of the steel and the many details of forging, casting, machining, assembly, etc.

Units can be furnished with or without self-contained or separate hydraulic power systems. Accessories are as specified. For a well-executed job—a press built as you want it—see Bethlehem. Our engineers will be glad to discuss the preliminaries with you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

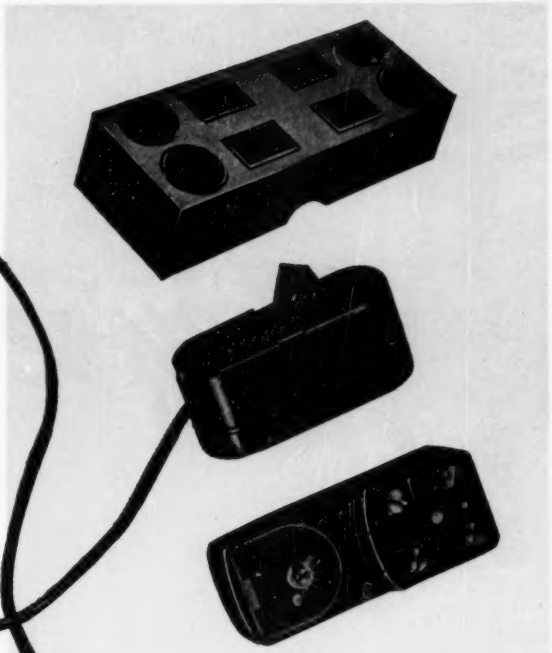
BETHLEHEM
Custom-Built
HYDRAULIC PRESSES
FOR
PLASTICS • METAL-FORMING • WALLBOARD
FIBER BOARD • VULCANIZING

MONSANTO announces . . .

A new, FAST-CURING Electrical-grade molding powder

RESINOX 10900

mica-filled phenolic molding compound



an outstanding improved new formulation with:

- Excellent Molding Characteristics
- Superior Electrical Properties
- *Remarkably* Faster Cure

Physical Properties of Monsanto's New RESINOX 10900

	Average Values
Specific Gravity	1.71
Weight per Cubic Inch	28.0 grams
Flexural Strength	9,000 lbs/square inch
Tensile Strength	6,000 lbs/square inch
Impact Strength	0.35 to 0.40 ft-lbs/inch
Dielectric Strength | S/T	400 to 450 vpm
@ 60 cycles | S/S	350-400 vpm
Power Factor @ 1MC	0.010 to 0.011
Dielectric Constant @ 1MC	4.10 to 4.20
Water Absorption	0.03% by weight
Shrinkage	0.003 to 0.004 inch/inch

Molding Data

Particle Size	Ground to pass U. S. standard 10-mesh screen
Apparent Density	0.75 to 0.85 grams/cc
Bulk Factor	2.01 to 2.28
Pourability	10 to 15 seconds
Preforming Characteristics	Preforms readily in automatic preforming machines
Flow	8 to 18

Values determined under appropriate A.S.T.M. methods.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY . . .
WHICH SERVES MANKIND

Monsanto's new Resinox 10900 is an *entirely new* thermosetting powder. Its combination of advantages is unique among "low-loss" materials: fast cure, smooth flow, ready release, excellent molding cycles and lowered production costs.

On most pieces the cure rate of Resinox 10900 is *two to three times faster* than other electrical powders . . . and approximately equal to the curing speed of most *general purpose* materials. Resinox 10900 releases readily from the mold, thus making it especially suitable for molding around metal inserts.

***And,* unlike other attempts at improving moldability of materials, Resinox 10900 has been developed WITHOUT ANY SACRIFICE OF ELECTRICAL PROPERTIES. This is *big news* for your customers who manufacture or use electrical components—communications or television or control equipment and parts. And a big *selling point* for you.**

Best of all, you pay no premium for Resinox 10900. You can have this premium grade material at regular prices. Send for more information, or order a trial drum of Resinox 10900 for use on a current job. The coupon is for your convenience. Resinox: Reg. U.S. Pat. Off.

MONSANTO CHEMICAL COMPANY
Plastics Division, Dept. MPLP21
Springfield 2, Mass.

☐ Please enter my trial order for one drum of Resinox 10900.

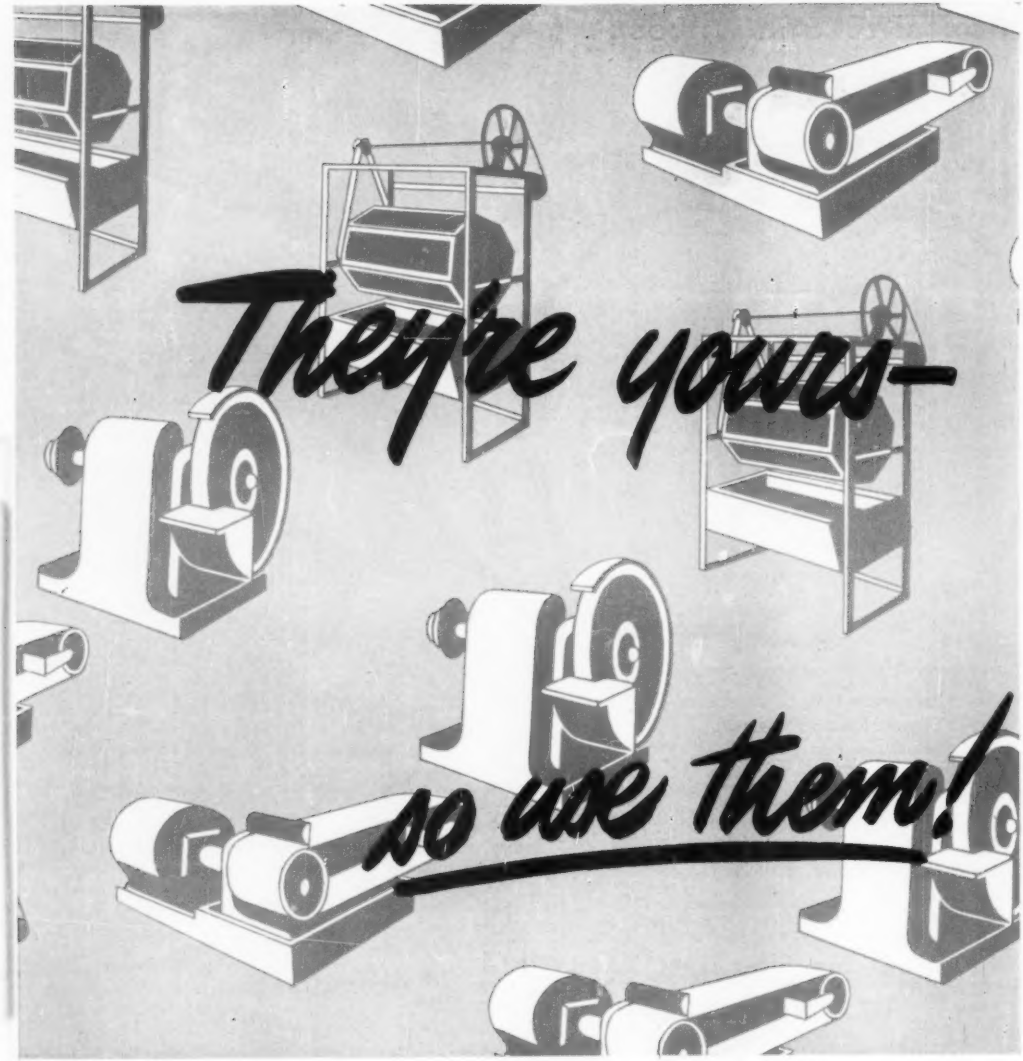
☐ I would like further information on Resinox 10900 for _____ (state application)

Name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____



They're the special, high-speed grinders, sanders, tumbling barrels and conveyor belts that enable Norton Laboratories, one of America's great names in custom molding, to produce over 350,000 compression and injection molded pieces every work day.

They finish plastic assemblies, subassemblies, parts and complete products for leaders in American industry. They operate solely to turn out the finest plastic items at low cost.

And they're your machines . . . if you need compression and injection moldings made by men who *know how.*

Put us to work now, without obligation to you, on design recommendations, price estimates and delivery dates for your next job . . . or, if you prefer, ask a Norton *engineer* (that's right, not salesman, but *engineer*) to call on you for a free consultation. Norton Laboratories, Inc., Lockport, N. Y. Sales Offices: *New York—347 Fifth Avenue; Chicago—9 South Clinton Street, Cleveland—4504 Superior Avenue.*

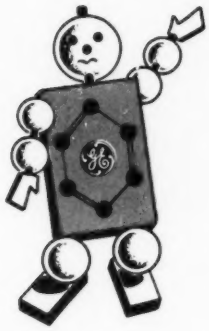
NORTON *Laboratories, Inc.*

COMPRESSION AND INJECTION MOLDING

NOW MOLDERS CAN OBTAIN

FAST-CURING

GENERAL-PURPOSE MOLDING COMPOUNDS



NEW GENERAL ELECTRIC POWDERS GIVE YOU:

1 Increased production. Production increases up to 25%, resulting from shorter curing times, have been realized by using these compounds.

2 Lower cost per part. Because curing times are reduced compared with present powders, these new compounds give molders lower costs per part.

3 More parts per pound. The low specific gravity of these new compounds means more molded parts per pound of material.

4 The benefits of high-speed automatic molding. A specific granulation makes these compounds exceptionally well suited for high-speed automatic molding operations.

These new General Electric phenolic compounds were developed to meet the need of wiring device manufacturers for a fast-curing molding material for such products as cube taps and outlets. Find out how you may turn out parts of superior finish while increasing production and lowering costs.

WRITE TODAY for data sheets and free samples to Section 38-9, Chemical Department, General Electric Company, Pittsfield, Mass.

HERE'S PROOF!

Look at these actual examples of shortened curing times obtained with G.E.'s fast-curing compounds (details on request).

Flatiron handle . . . . cured in 30 seconds.

Lighting fixture . . . . cured in 15 seconds (reduced from 30 seconds).

Cover plate . . . . . cured in 30 seconds (reduced from 90 seconds).

Luggage handle . . . . cured in 40 seconds (reduced from 75 seconds).

Commutator . . . . . cured in 35 seconds (reduced from 45 seconds).

Wall plate . . . . . cured in 15 seconds.

How can these new fast-curing compounds cut *your* schedules, increase *your* production, build *your* profits?

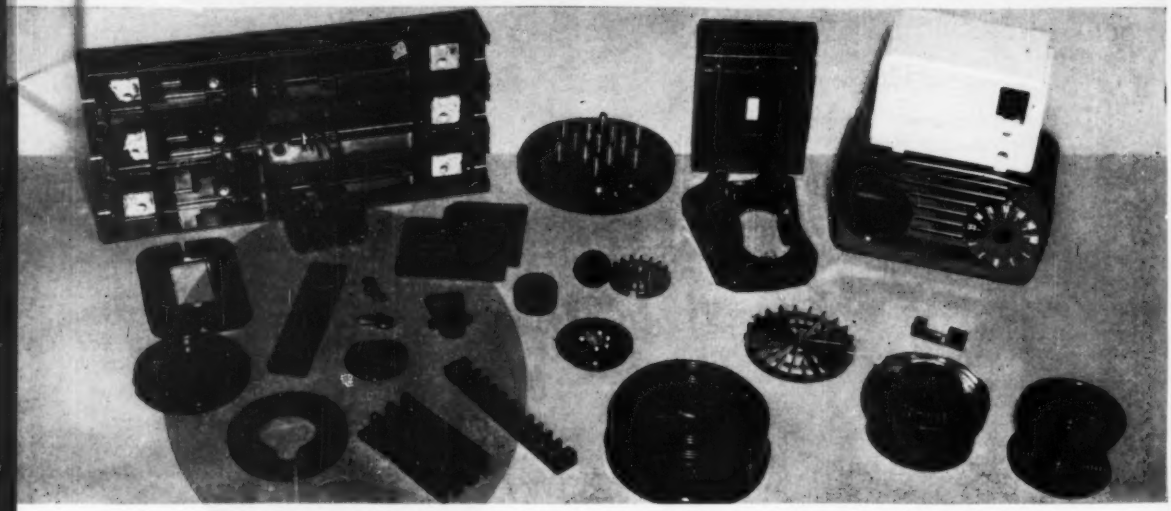
You can put your confidence in—

GENERAL ELECTRIC

CD49-85

TECH-ART

ups production 25% with

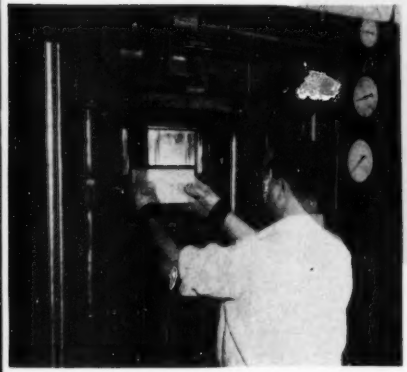


SAMPLES OF TECH-ART'S VARIED PRODUCTION

Offering one of the most complete molding services in the United States, Tech-Art maintains an expert engineering staff to provide practical solutions to any problem of plastic molding.

COMPLEX PARTS

This 20-cavity mold is producing an electronic part for television tuning equipment, with ceramic and metal inserts. Critical dimensions of this piece must be held to within .0005". Only tumbling is required for finish.



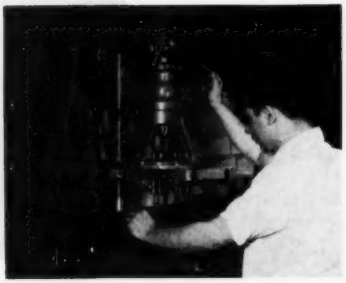
STRAIGHT COMPRESSION MOLDING

Radio cabinets of ivory urea are compression molded from a single cavity, steam heated mold, on a one minute cycle.

There's over half a century of experience behind Tech-Art Plastics Company—which adds extra significance to their appraisal of equipment. Concerning the three Baldwin Hy-Speed Plunger Molding Presses—one 200-ton, the others 100-ton—Mr. Robert Clochessy, General Manager, reports:

1. Units meet every need in high-speed production . . .
2. Both top plunger and mold clamping pressures can be easily controlled and adjusted. As a result, with the application of proper molding technique, these presses mold precision parts—held to close tolerances—with a minimum of flash, thus saving considerable finishing time.
3. The versatility of these presses is demonstrated by the fact that, when plunger molding work is not available, they handle compression molding jobs with equal facility and efficiency.

these "BALDWINS"



STREAMLINED PRODUCTION

Typical of the advanced mass-production facilities is this gang tapping, reaming and drilling head, adapted by Tech-Art engineers.

4. 25% more production has been obtained from the Baldwin presses than from any other similar equipment in the plant.

Baldwin Hy-Speed Plunger Molding Presses offer every modern feature that is needed to produce an almost endless variety of products, to close tolerances, at a high production rate.

For detailed information, ask for Bulletin 251.

PRECISION IS VITAL

A large proportion of Tech-Art production must be held to extremely close tolerances, demanding top precision in both presses and operations.

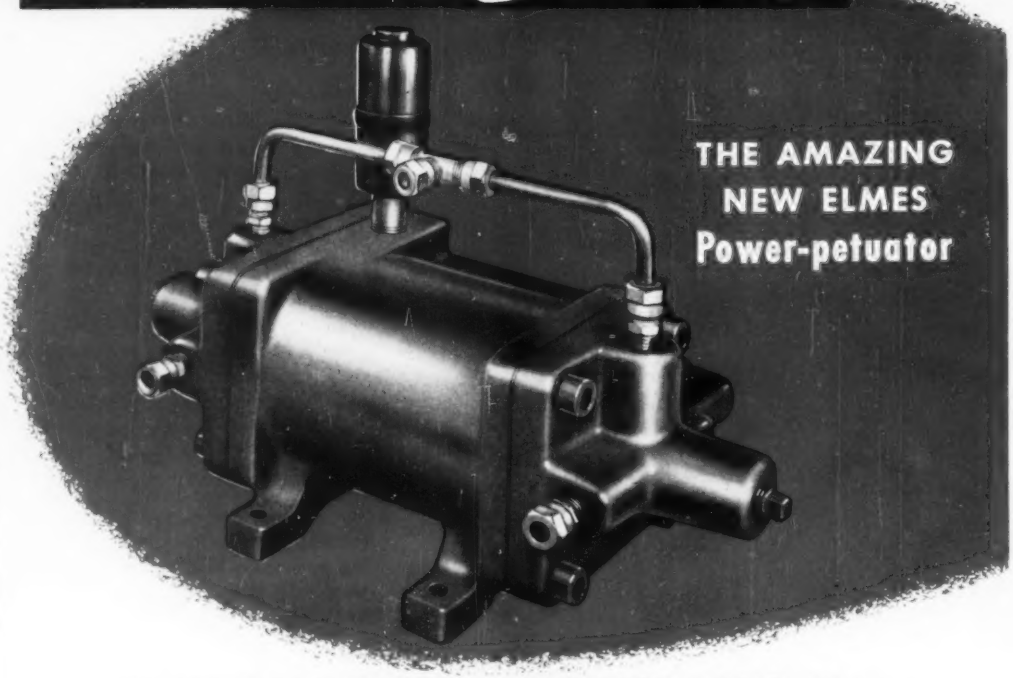
The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington. In Canada: Baldwin Locomotive Works of Canada, Ltd., Toronto, Ontario.

BLW THE BALDWIN GROUP

BALDWIN

HYDRAULIC PRESSES

POST-WAR PRESS *Sensation!*



Low-Cost ELMES HYDROLAIRS Now Deliver a Continuous Power Stroke

Here's a *welcome improvement* in small hydraulic presses—continuous power stroke that maintains the pressure you select . . . even on *compressible* materials. And when you add to this the many other Hydrolair advantages—small size; light weight; effortless operation, with your regular shop air line furnishing the power—you've *really* got something good.

NO OTHER PRESS LIKE THIS

Hydrolairs have *neither* pumps nor motors. The amazing new Elmes Power-petuator automatically transforms air-line pressure into *positive* hydraulic force. Packless construction assures freedom from maintenance. *Hundreds already in use.*

EASY TO BUY • EASY TO USE

Hydrolairs are as economical *to buy* as they are to use. The 30-ton bench-type sells for only $865.00; the 30-ton floor-type for $1085.00; and the 50-ton floor-type for $1900.00—f.o.b. Chicago. Hot plates and other accessories, extra. Ask for Bulletin 1036A *today*. Elmes Engineering Division of American Steel Foundries, Cincinnati 29, Ohio.

Bench- and Floor-Types Capacities to 50 Tons

Power-petuator, shown at rear of press, is enclosed in base of floor-types.

30-TON BENCH-TYPE

Opening, 0" to 13". Platen, 10" x 10". Stroke, 6". Dimensions, 30" x 29" x 47" high. Shipping weight, 980 lbs.

30-TON FLOOR-TYPE

Opening, 0" to 13". Platen, 10" x 10". Stroke, 6". Dimensions, 36½" x 19" x 65" high. Shipping Weight, 1325 lbs.

50-TON FLOOR-TYPE

Opening, 14". Platen 18" x 18". Stroke, 6". Dimens. 40" x 27" x 65". Ship. Wt., 2400 lbs. Push-button control, optional.

ENGINEERED BY ELMES

Good Hydraulic Production Equipment Since 1851

FOOD . . . CHEMICALS . . . CONSUMERS . . .

EVEN WHEN STRETCHED several hundred per cent, Plax Polyethylene sheet is tough, moisture-proof, odorless, tasteless, and pleasing to touch.

An ideal material for food packaging, it protects goodness without hiding it. Chemical inertness makes it an effective wrapper for everything from food to corrosive chemicals. These qualities, plus color, have led to its wide use in the home—as aprons, clothes bags, bowl covers, etc.

Plax also supplies Polyflex* Sheet and Film, and cellulose acetate, cellulose acetate butyrate and ethyl cellulose sheet and film. To be sure you have the complete story about Plax products, please write for details.

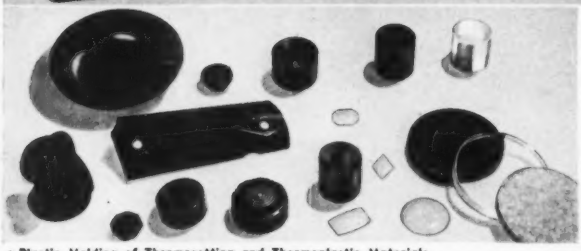
*T.M. reg. U. S. Pat. Off.

PLAX
FOR PLASTIC
NOT SUBSTITUTES ··· IMPROVEMENTS

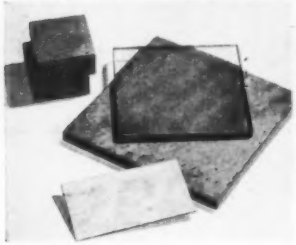
PLAX CORPORATION DIVISION, HARTFORD-EMPIRE CO.
P. O. BOX 1019 ★ HARTFORD 1, CONNECTICUT
In Canada — Canadian Industries, Ltd., Montreal

THE CARVER LABORATORY PRESS

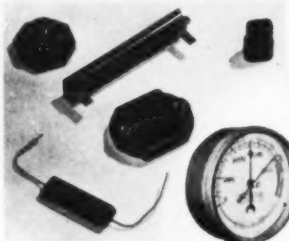
Results of Research and Development Done on the CLP



• **Plastic Molding of Thermosetting and Thermoplastic Materials.**
Molding samples, production and color control work, testing single cavity molds, etc.

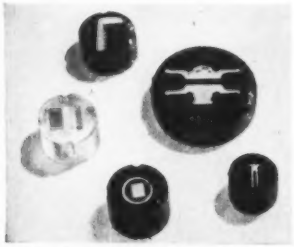


• **Laminating and Bonding**



• **Molded Pieces with Metal Inserts**

• **Rubber Molding, Vulcanizing, etc.**



• **Mounting Metallographic Specimens**

The Press as illustrated with hot plates is standard equipment for plastics research, molding and development work.

All of the items shown on this page were produced on the Carver Laboratory Press by users in the Plastics Industry.

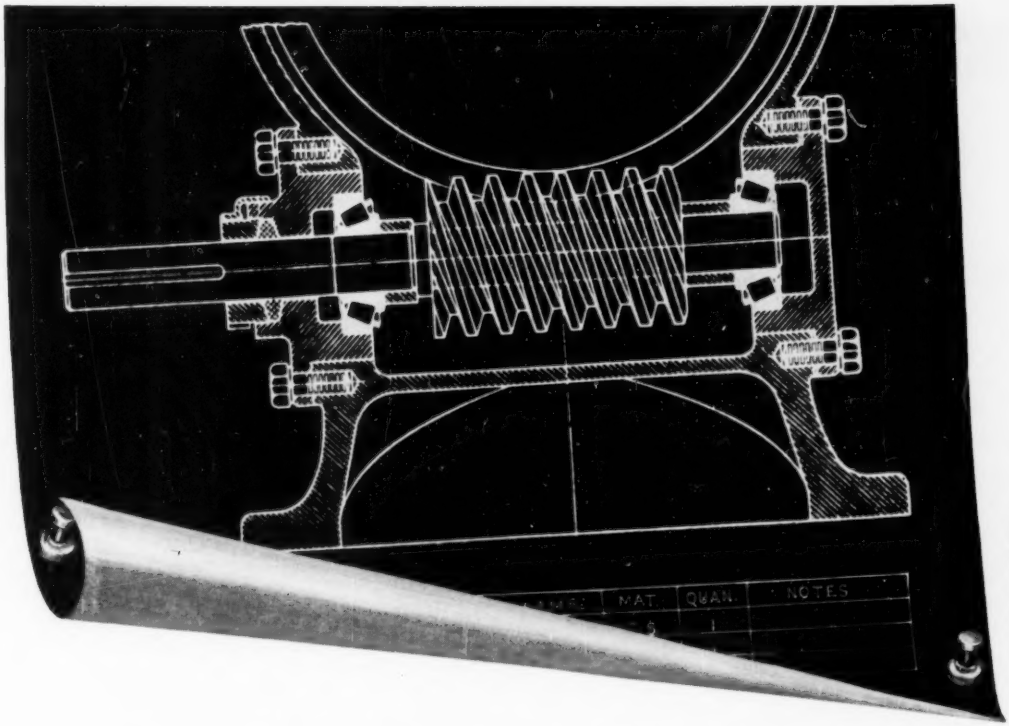
IN THOUSANDS of leading industrial firms, government and technological laboratories the Carver Laboratory Press is an indispensable aid in plastics research and development.

The Carver Laboratory Press, original in design, has long been accepted as standard for making quick, accurate small-scale tests; for development, research and instruction work; testing single cavity molds; preparation of samples, and even for small scale production. The Carver Press provides complete range of temperatures from room temperature to 400°F. Adjustable by thermoswitch to within plus or minus 2°F. Equipped with accurate 6" gauge, providing load readings up to 20,000 lbs. Low pressure gauges optional. Carver Standard Accessories include Electric or Steam Hot Plates; Electrically Heated and Water Cooled Hot Plates; Carver Test Cylinders; Swivel Bearing Plates; Cage Equipment, etc. The press and certain of the accessories are patented. Send for catalog. PROMPT SHIPMENT FROM STOCK.

GENERAL SPECIFICATIONS

Load	Platens	Opening	Stroke	Dimensions
0 to 10 tons (20,000 lbs.)	6" x 6" square	Adjustable 0 to 16" (7⅞" between Columns)	6½"	18" x 16" x 36"

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
353 HUDSON ST. NEW YORK 14, N. Y.



How to make your product do more work with less play

YOUR product does its job more efficiently and lasts longer when every rotating shaft is mounted on Timken® tapered roller bearings.

Timken bearings hold shafts in true alignment, prevent shaft deflection and end-play, keep gears meshing smoothly. Due to their tapered construction, Timken tapered roller bearings take any combination of radial and thrust loads. Special thrust bearings or washers are unnecessary. Design can be simplified—space saved.

Timken bearings are manufactured to extreme precision. Their true rolling motion practically eliminates friction on moving parts. Line contact between the rolls and races provides maximum load-carrying capacity.

Made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel—Timken bearings last the life of the machine in which they are used.

No other bearing can bring you *all* the advantages you get with Timken bearings—backed by fifty years of research and development. Make them standard in all the machinery you buy or build. And look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

50th birthday of the company whose products you know by the trade-mark: TIMKEN

TIMKEN 1899 50 1949 YEARS

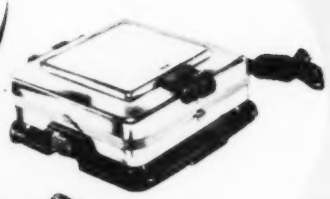
TIMKEN

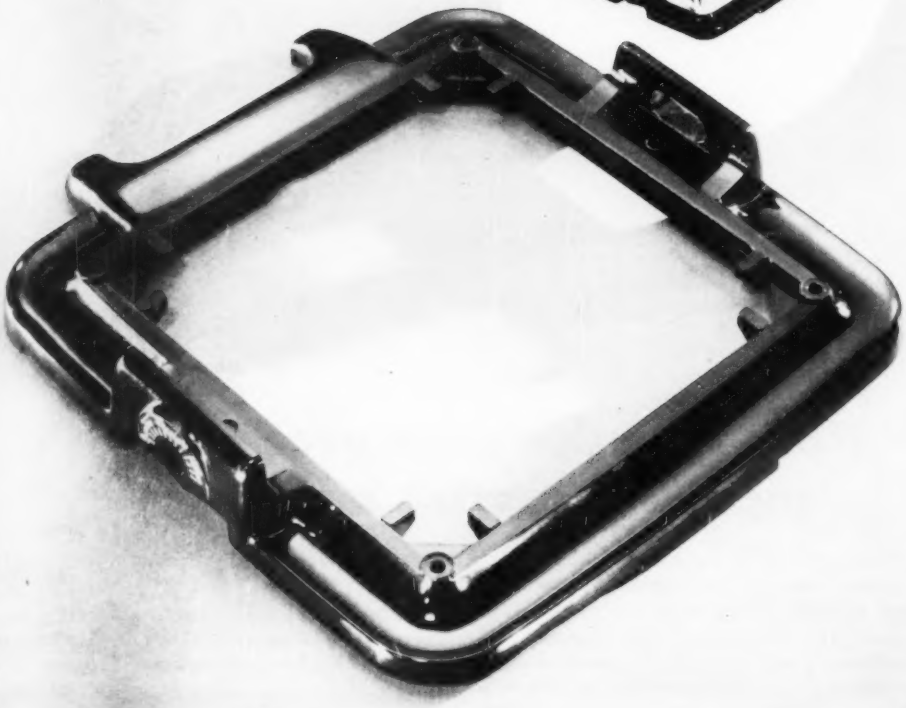
TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION

DURITE



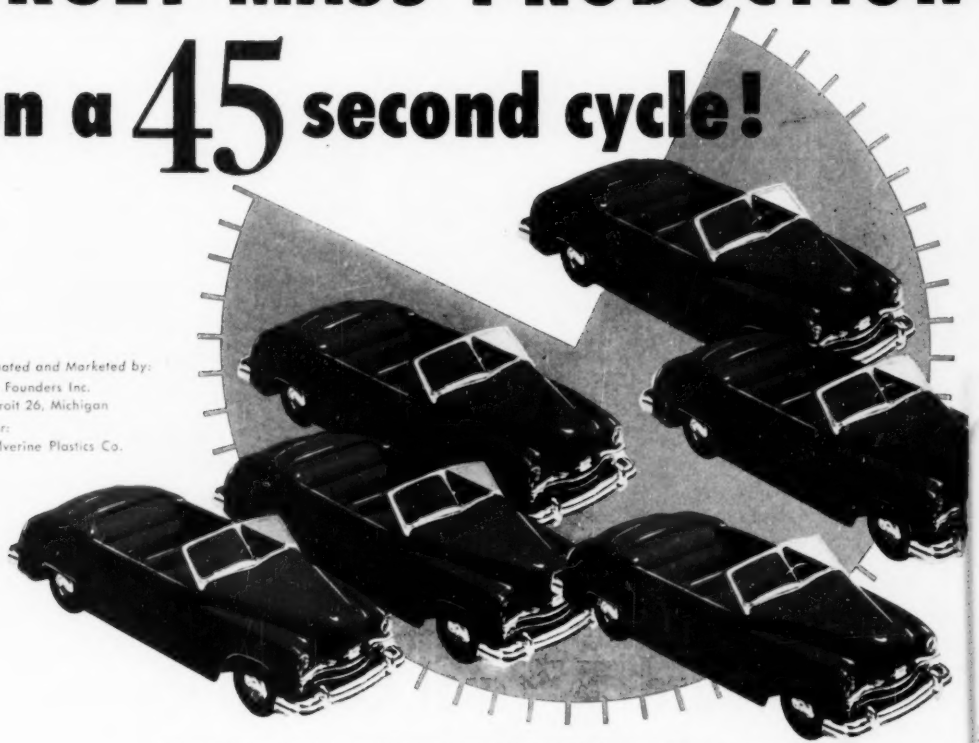


★ LUSTROUS FINISH ★ HEAT RESISTANCE
★ ADEQUATE INSULATION ★ FAST CURE
★ GOOD MACHINEABILITY

Normal properties of DURITE Phenolic Compounds imparted to waffle baker and grill base molded by The General Industries Co. for Noblitt Sparks Industries, Inc.

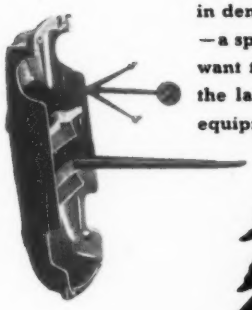
THE BORDEN COMPANY
Chemical Division
5000 SUMMERDALE AVE., PHILA. 24, PA.

TRULY MASS PRODUCTION on a 45 second cycle!

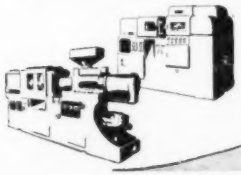


Originated and Marketed by:
Toy Founders Inc.
Detroit 26, Michigan
Molder:
Wolverine Plastics Co.

AS MOLDED ON A FELLOWS-LEOMINSTER MACHINE, 8 ounces of acetate in a single-cavity mold forms these big-name-auto 11-inch miniatures so widely in demand. F-L "SPEED-FLO" machines have stepped up the time cycling —a speeding up that pays off in molding profits. It's something you're bound to want to look into. The new-design Fellows Leominster Machines are just about the last word in high speed molding capacity. Every man in the market for equipment owes himself an investigation into F-L "SPEED-FLO" features.



Fellows
LEOMINSTER
injection molding equipment



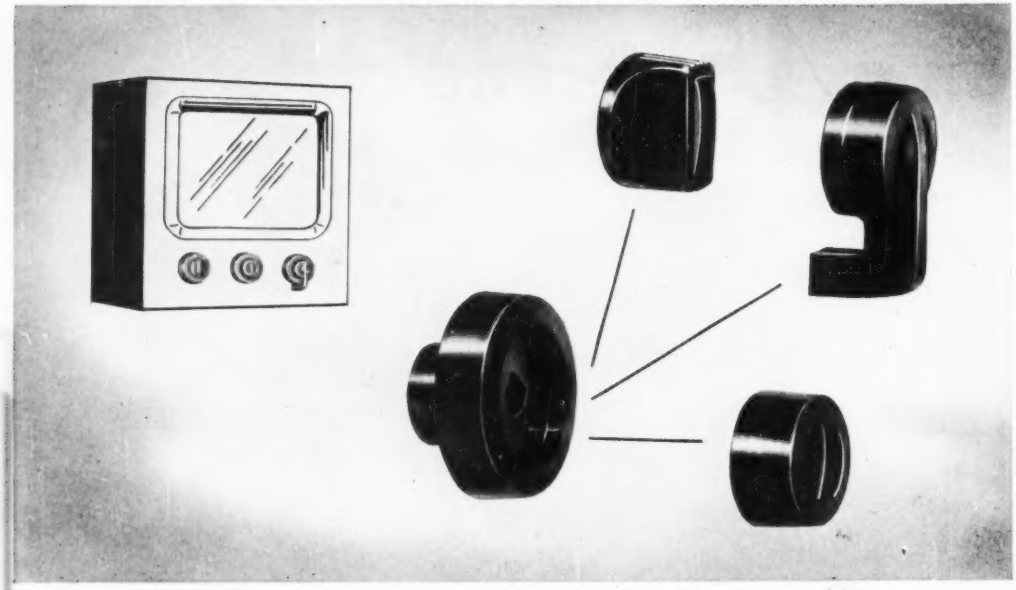
WANT THE DETAILS?

Send this coupon or write us on your business letterhead.

Name_____ Title_____
Company_____
What capacity machine most interested in?_____ Oz._____
Street Address_____
City & State_____

THE FELLOWS GEAR SHAPER CO., Plastics Machine Div.: Head Office and Export Dept., Springfield, Vermont. Branch Offices; 618 Fisher Bldg., Detroit 2. 840 West Town Office Bldg., Chicago 12. 7788 Empire State Bldg., New York 1. New England Distributor; Leominster Tool Co., Leominster, Mass.

For a Clearer Production Picture...Tune in on



Standard TV Dual Control Knobs

HERE'S AN END to TV knob design problems and the high cost of custom knobs, too. Here's the Kurz-Kasch line of standard plastic dual control knobs—standardized for universal fit —standardized for dependable use—standardized for economy. With Kurz-Kasch TV knobs, you can begin to eliminate some of your costly assembly variables.

Because warp and cold-flow are best eliminated by thermo-setting materials, these knobs are compression-moulded for complaint-proof long life. Like all Kurz-Kasch standard parts, they are produced in a variety of dimensions, colors, finishes and decorative designs.

TV Dual Control Knobs are the newest additions to the Kurz-Kasch Standard Parts Line — long considered America's foremost source of standard plastic knobs and handles. For complete specification and dimensional data, write for Kurz-Kasch Specification Sheet No. 432. Or ask for new catalog 103A listing our complete line of TV Knobs, Radio Knobs, Instrument Knobs and Control Balls. No obligation.

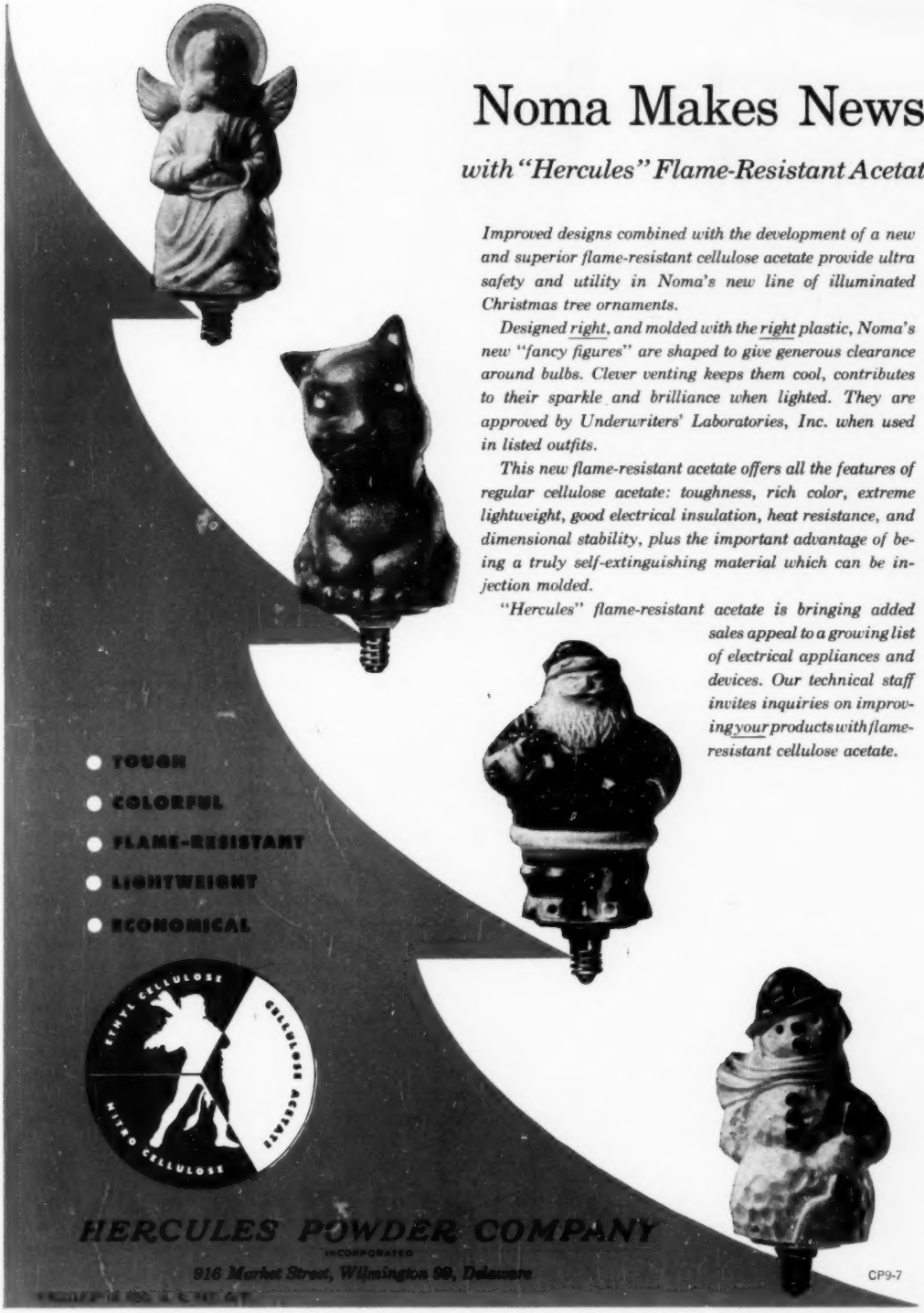
Kurz-Kasch

FOR OVER 33 YEARS PLANNERS AND MOULDERS IN PLASTICS

Kurz-Kasch, Inc. • 1415 South Broadway • Dayton 1, Ohio

BRANCH SALES OFFICE: New York, *Lexington 2-6677* Chicago, *Harrison 5473* • Detroit, *Woodward 2-5214* Philadelphia, *Granite 2-7484* • Dallas, *Lakeside 1022* Los Angeles, *Prospect 7503* • St. Louis, *Rosedale 3542* Toronto, Canada, *Adelaide 1377*.

EXPORT OFFICES: 89 Broad Street, New York City, *Bowling Green 9-7751*.


Noma Makes News
with "Hercules" Flame-Resistant Acetate
Improved designs combined with the development of a new and superior flame-resistant cellulose acetate provide ultra safety and utility in Noma's new line of illuminated Christmas tree ornaments.
Designed right, and molded with the right plastic, Noma's new "fancy figures" are shaped to give generous clearance around bulbs. Clever venting keeps them cool, contributes to their sparkle and brilliance when lighted. They are approved by Underwriters' Laboratories, Inc. when used in listed outfits.
This new flame-resistant acetate offers all the features of regular cellulose acetate: toughness, rich color, extreme lightweight, good electrical insulation, heat resistance, and dimensional stability, plus the important advantage of being a truly self-extinguishing material which can be injection molded.
"Hercules" flame-resistant acetate is bringing added sales appeal to a growing list of electrical appliances and devices. Our technical staff invites inquiries on improving your products with flame-resistant cellulose acetate.
TOUGH
COLORFUL
FLAME-RESISTANT
LIGHTWEIGHT
ECONOMICAL
ETHYL CELLULOSE
CELLULOSE ACETATE
NITRO CELLULOSE
HERCULES POWDER COMPANY
INCORPORATED
916 Market Street, Wilmington 99, Delaware
CP9-7

The New NASH "103"

AUTOMATIC FLASH LATHE

20 to 60 PERFECTLY DEFLASHED PIECES PER MINUTE

Fastest, most accurate method of removing flash from circular molded pieces. Results far superior to hand flash removal. Labor costs substantially reduced.

Is hand flash removal slowing down your production of circular moldings and costing you more money than it should? There's no reason for such a situation.

A Nash "103" Automatic Flash Lathe will quickly correct things. How? By turning out 20 to 60 perfectly deflashed circular or cylindrical moldings per minute at minimum cost. It's operation is confined to the flash area exclusively, assuring that the surface appearance of the molded piece is maintained.

Flash is removed by common or carbide tipped files, mounted in tool holders having universal adjustment. (Cutter, grinding wheels, buffers, etc., may be used as well.) The operator merely places the pieces to be deflashed onto the bottom spindles of the "103" Flash Lathe. The top idler spindle descends to clamp the molding and it begins to revolve as it moves back toward the tool posts. After the piece has contacted all three deflashing stations, the spindle stops revolving, the top center raises and the perfectly finished part is ejected automatically.

The "103" Flash Lathe has 10 spindles and can deflash moldings up to 4½" diameter when all spindles are used, and up to 6" diameter when alternate spindles are employed. What's more, all necessary adjustments of spindle speeds and heights are easily made. Height adjustments vary from nothing to 8".

You're spending extra money *needlessly* every time a circular or cylindrical molding is deflashed by hand in your plant. Write today for complete details about the money-saving, product-improving Nash "103" Automatic Flash Lathe. Don't delay!

IF IT'S ROUND NASH CAN SAND IT

J. M. NASH COMPANY

2369 NORTH 30th STREET • MILWAUKEE 10, WISCONSIN

Koppers New

CAMERA BLACK

POLYSTYRENE

solves four important problems

A manufacturer of cameras and photographic equipment was searching for one plastic that would solve four major problems. The plastic must have (1) complete opacity, (2) photochemical inertness, (3) higher heat distortion resistance than general-purpose polystyrene and (4) the cost must be low.

Koppers Camera Black Polystyrene can be used for cameras, film holders, film cartridges, film cartridge winding machines, developing tanks, etc. Spools molded for Polaroid by Ontario Plastics, Rochester, N. Y.

KOPPERS Company went to work on these problems and developed a special polystyrene—CAMERA BLACK—which had all the desired characteristics.

It had complete opacity. Tested with supersensitive film in comparison with a ½-inch steel plate, the Koppers Camera Black showed equal opacity. The film was covered with a polystyrene sheet 1/16" thick, then half the film was covered with the steel plate and the entire covering exposed to a 500 watt lamp for 15 minutes. The developed film showed no difference between the two halves.

It had photochemical inertness. Camera Black Polystyrene showed no chemical reaction to the most sensitive film and to the chemicals used in the photographic processes.

It had high resistance to heat distortion. Koppers new Polystyrene has a minimum heat distortion temperature of 200°F. Products made from it do not distort under the heat of window displays or from being washed in scalding water.

The cost was low. Koppers Camera Black Opaque Polystyrene sells at the same low price of regular polystyrene in special colors. There is no added premium.

What is your problem in plastics?

Koppers maintains a staff of chemists, molding and material engineers and technical specialists who are ready to help you at any time. If you have a special problem, write and tell us about it.

Koppers Perfected Plastics include many formulations of Polystyrene, Cellulose Acetate and Ethyl Cellulose. These are available in transparent, translucent and opaque and in any desired color. Write for complete information.

KOPPERS COMPANY, INC.
Chemical Division **Pittsburgh 19, Pa.**
Regional offices: New York, Boston, Chicago and San Francisco

Koppers Company, Inc.
Chemical Division, Dept. MP-9
Pittsburgh 19, Pa.

Please send me data on Koppers Camera Black Polystyrene.

Name_____ Position_____

Company_____

Address_____

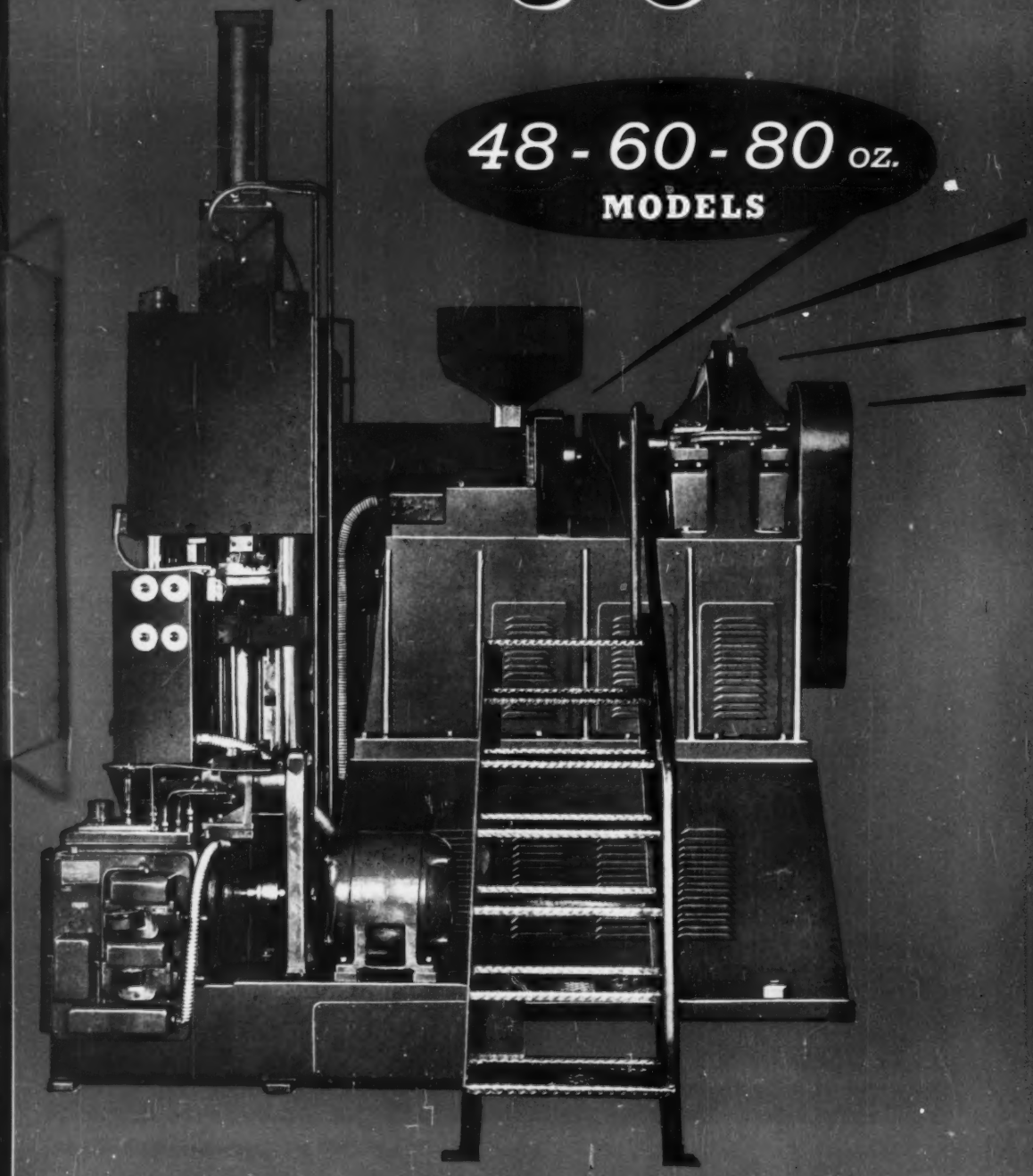
KOPPERS

Koppers *Perfected* **Plastics**

*POLYSTYRENE *ETHYL CELLULOSE *CELLULOSE ACETATE

NEW J-C PRESS

48 - 60 - 80 oz.
MODELS



MAKES *SUPER-SIZE* INJECTION MOLDINGS!

LOW OPERATING PRESSURES!

100% PLASTICIZATION!

EXTRA-FAST CYCLES!

Meet the spectacular J-C Press* . . . the all-new machine that mass-produces **extra-large, high quality** moldings at record speeds . . . and at unmatched economy per molded piece. And because it operates at amazingly **lower** pressures than other machines, the J-C Press is light in weight, low in price, small in size and tremendously cheaper to operate and maintain.

Here's the explanation . . . The J-C Press is a complete departure from conventional injection molding machine design. Look at the picture and you'll see that it is actually an extruder (below the hopper) and a vertical, transfer-type press — all in one! *The specially-built extruder does three jobs: 1—it heats, 2—it* ***completely and uniformly*** *plasticizes, and 3—it feeds the molding compound directly into the vertical torpedo-less injection chamber in* ***exact*** *one-shot doses—all automatically.* Due to this complete pre-plasticization, injection pressures are negligible. For example, on a 23-ounce shot of polystyrene we use 3100 psi as against 25,000 psi on a conventional machine. Locking pressures are low (often 300% to 400% less) and only small pumping units are required.

Thanks to this radical new design, the J-C Press operates on an uninterrupted high-speed schedule. Cycle succeeds cycle at rapid-fire tempo with automatic timers controlling each step in the entire press operation — plasticizing, feeding, injecting, clamping, cooling and opening. There's no downtime anywhere along the line.

And thanks to this same sensational design, *the J-C Press can be used not only for injection molding but for compression and transfer molding as well! Even the extruder can be put to separate use on regular extrusion runs!*

*Patents applied for

WRITE NOW FOR COMPLETE INFORMATION

The spectacular J-C Press opens up a new and virtually untapped market for large thermoplastic pieces throughout the industrial world. Act now to insure **your** position in the field by writing today for detailed specifications, prices and delivery dates on the model (48, 60, or 80-ounce) whose capacity fits your needs.

WORK WELL DONE, SINCE '81

J-C

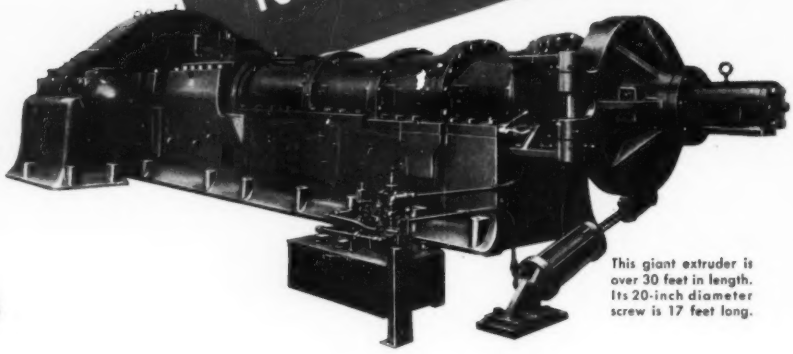
Jackson & Church

COMPANY

SAGINAW, MICHIGAN

You are looking at...

THE LARGEST EXTRUDER EVER BUILT FOR WORKING PLASTICS



This giant extruder is over 30 feet in length. Its 20-inch diameter screw is 17 feet long.

This giant in the standard series of Farrel-Birmingham extruders is over 30 feet long, and the screw contained in the five-section cylinder is 20 inches in diameter and 17 feet in length.

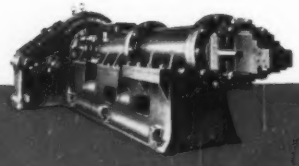
The machine receives raw material in a continuous flow through a rectangular hopper in the first cylinder section. From here the stock is worked and forced forward by the screw through a perforated plate before passing through the downward discharge die.

Both screw and cylinder are hard-surfaced and cored for the circulation of temperature-controlling fluid. The swinging die head has a hydraulically operated bayonet-type lock. The overall construction, which combines the use of Meehanite metal and steel, is extremely heavy and rugged to permit high-pressure operation.

Farrel-Birmingham extruders are available in 6", 8½", 12", 15" and 20" screw diameter sizes for processing rubber and plastics. *Write for complete information.*

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston.



8½" extruder for working plastics.

FB-488

Farrel-Birmingham

NOW

national distribution for Pliobond

—the adhesive that "Bonds Anything to Anything"

NOW you can get **Pliobond**—the adhesive that "bonds anything to anything"—from a distributor located conveniently near you. That means *quicker service* in answering your bonding problems. You can get technical assistance *locally*—get just the amount of **Pliobond** you need in small or large containers.

Pliobond is a tan-colored, cold-setting thermoplastic liquid that dries rapidly to a waterproof, chemically resistant bond with very high strength and permanent flexibility. Easily applied by brushing, spraying, spreading or rolling—bonds hot (dry), by reactivation, or cold (wet). **Pliobond** will bond practically any solids—permanently.

For full details, see your distributor or write:

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Akron 16, Ohio

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2170 W. Market St.
Akron 13, Ohio

2
CAMPBELL INDUSTRIES
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Mahomet, Illinois

3
UNITED FINISH CO.
Corwin St.
Peabody, Mass.

4
WILSOLITE CORP.
501 Amherst St.
Buffalo, N. Y.

5
N. L. KUEHN CO.
1053 N. 4th St.
Milwaukee 3, Wisc.

6
CORN BELT ADHESIVES
12th Ave. & 4th St.
Council Bluffs, Iowa

7
BOND ADHESIVES CO.
255 Wallabout St.
Brooklyn, N. Y.

8
C. H. STUMP
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San Francisco, Calif.

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ACORN ADHESIVES
& SUPPLY CO.
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USE PROVED Products

GOODYEAR

Pliobond—T.M. The Goodyear Tire & Rubber Company

Dress up your bulk shipments in

Decorated LEVERPAK DRUMS

choice of (17) colors . . . choice of (14) inks

NOW YOU CAN deliver your dry bulk products in style—make them part of your package "family"... traveling billboards through all stages of use and reuse.

Continental can supply you with improved Leverpak drums in any of seventeen eye-catching colors. We can reproduce your name and trademark in any of fourteen different inks. And there's no waiting for this service. We're set up to start the drums rolling your way as soon as you give us the word.

LEVERPAKS—unpainted or in colors—are the best-looking, most serviceable fibre shipping drums we have ever turned out. They load compactly and ride safely. The patented locking device is easy to open, easy to close. Metal chimes are flash butt welded for greater strength.

If you want a sturdier container . . . one that will "dress up" your bulk shipments, contact our nearest office for full details on Leverpak and other Continental drums.

CONTINENTAL CAN COMPANY

Paper Converting Division • *Fibre Drum Section*
Van Wert, Ohio

NEW YORK • PHILADELPHIA • PITTSBURGH • TONAWANDA • CLEVELAND
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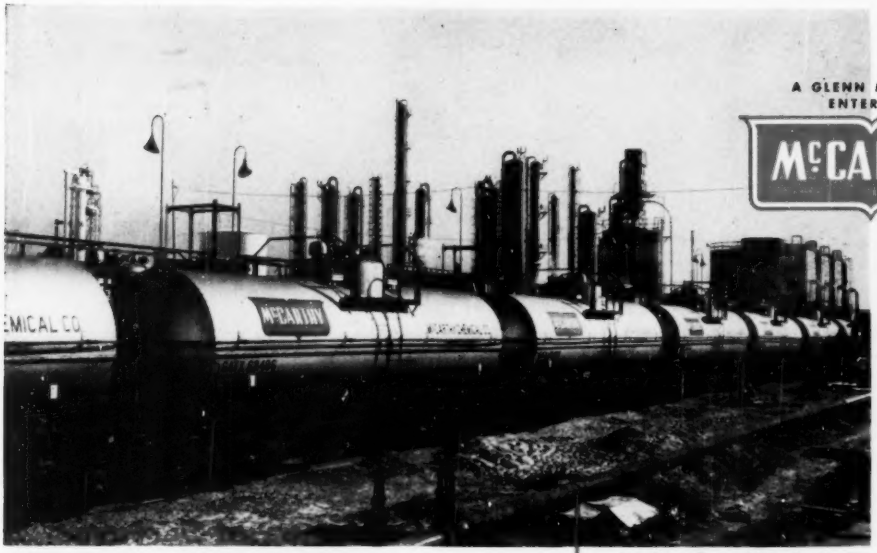


A GLENN McCARTHY ENTERPRISE

McCARTHY

Loading Formaldehyde in the 10,000 gallon tank cars operated by McCarthy. Each car is especially lined and insulated.

Time to Talk '50 with McCarthy

Chemical process industries are planning ahead, checking 1950 contract needs, looking to the McCarthy Chemical Company to meet those requirements from the predictable volumes of primary and intermediate chemicals flowing today from the new McCarthy unit at Winnie, Texas.

Assured supplies of petro-chemicals are made possible by the unique McCarthy "flow-chart" — a production cycle that begins and ends with McCarthy-owned and operated facilities and resources that provide unlimited reserves of natural gas, a supervised gathering system and the fully controlled processing of hydrocarbons.

From well to market, this steady and uninterrupted flow of raw materials for plastics, dyes, explosives, paints and other chemical applications is helping meet today's demands efficiently, economically, promptly.

Now it's time to talk '50 with McCarthy. Look to McCarthy Chemical Company for your 1950 contract requirements—consult McCarthy about your needs. Write, wire or call today.

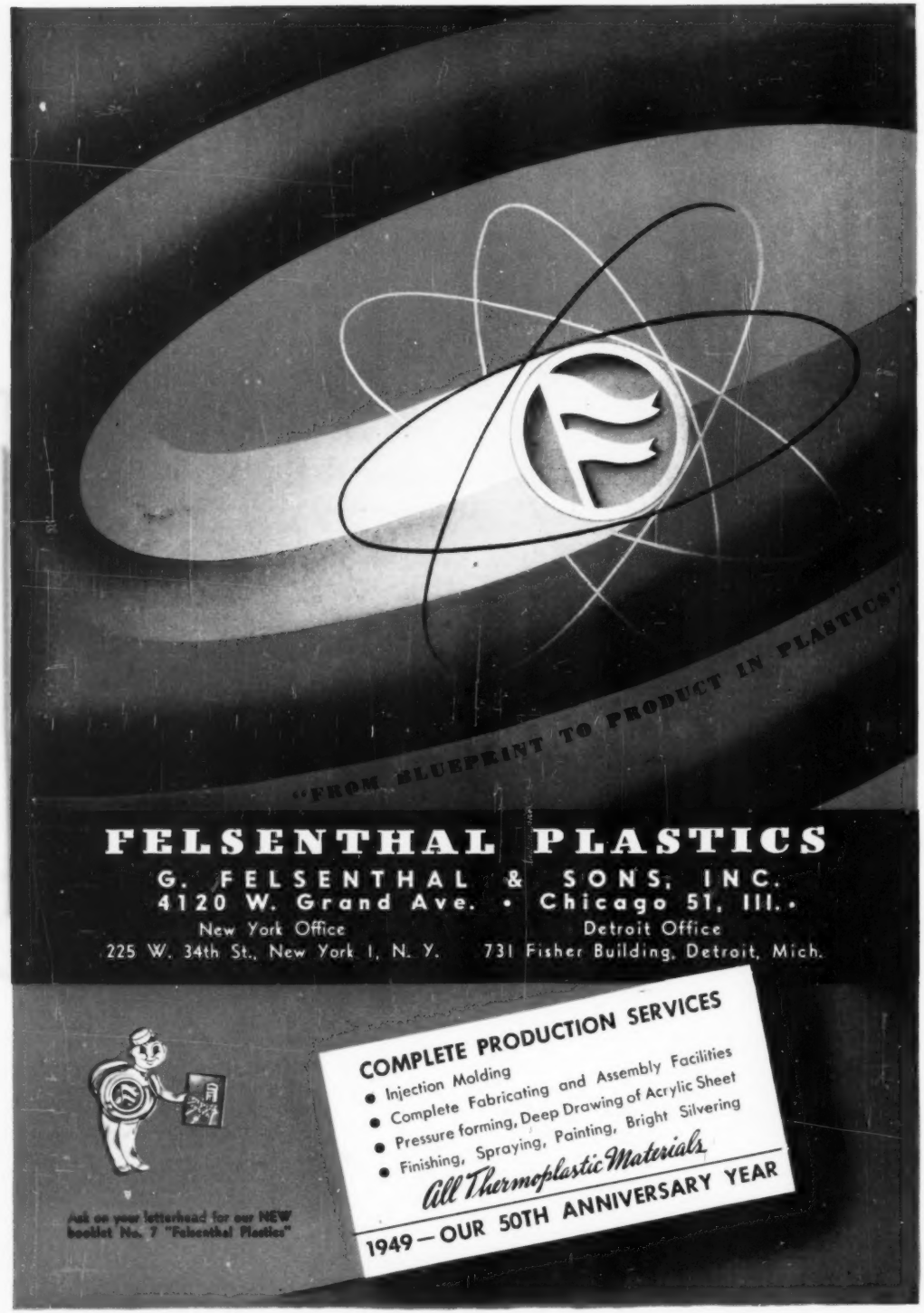
- **37% Inhibited Formaldehyde**
- **37% Uninhibited Formaldehyde**
- **Methanol**
- **Propane**
- **Acetaldehyde**
- **Fuel Oils**
- **Butane**
- **Gasoline**
- **Kerosene**

New Horizons in Hydrocarbons

McCarthy producing companies are planning ahead with industry, exploring New Horizons in Hydrocarbons through more economical, more efficient processes, conserving more and more of our valuable natural resources by converting yesterday's wastes into today's valuable raw materials.

McCARTHY CHEMICAL COMPANY

SHELL BUILDING — HOUSTON, TEXAS TELETYPE NO. 181 PHONE: PRESTON 7204


"FROM BLUEPRINT TO PRODUCT IN PLASTICS"
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COMPLETE PRODUCTION SERVICES
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• Finishing, Spraying, Painting, Bright Silvering
All Thermoplastic Materials
1949—OUR 50TH ANNIVERSARY YEAR
Ask on your letterhead for our NEW booklet No. 7 "Felsenthal Plastics"

PRICES REDUCED AGAIN

SANTICIZER 141
SANTICIZER 160

primary vinyl plasticizers

New lower prices now are in effect for Santicizer 141 and Santicizer 160, two Monsanto Plasticizers that improve products made of vinyls. The Santicizers, used separately or in combination, add numerous desirable qualities to films, sheetings, extrusions, protective coatings and floor tiles.

For quotations and technical information on Santicizer 141 and Santicizer 160, mail the coupon, contact the nearest Monsanto Sales Office or write: MONSANTO CHEMICAL COMPANY, Desk J, Organic Chemicals Division, 1707 South Second Street, St. Louis 4, Missouri. *Santicizer: Reg. U. S. Pat. Off.*

advantages of SANTICIZER 141

Excellent processing action
Low-temperature flexibility
Flame resistance
Light stability, resistance to embrittlement
Low volatility
Non-toxicity

advantages of SANTICIZER 160

Low cost
Excellent processing action
High tensile and tear strength
Low burning rate
Oil and abrasion resistance
Heat and light stability

advantages of 141 and 160 blends

Mixtures yield formulations with:
Economic advantages
Excellent processing characteristics
Good light and heat stability
Excellent outdoor weathering properties
Good low-temperature flexibility
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Good "hand" and drape

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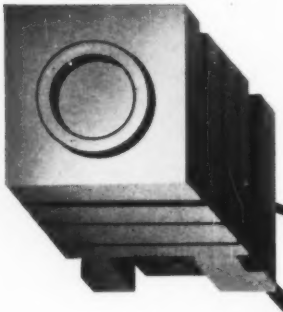

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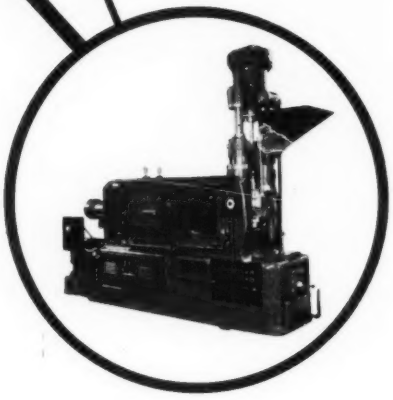

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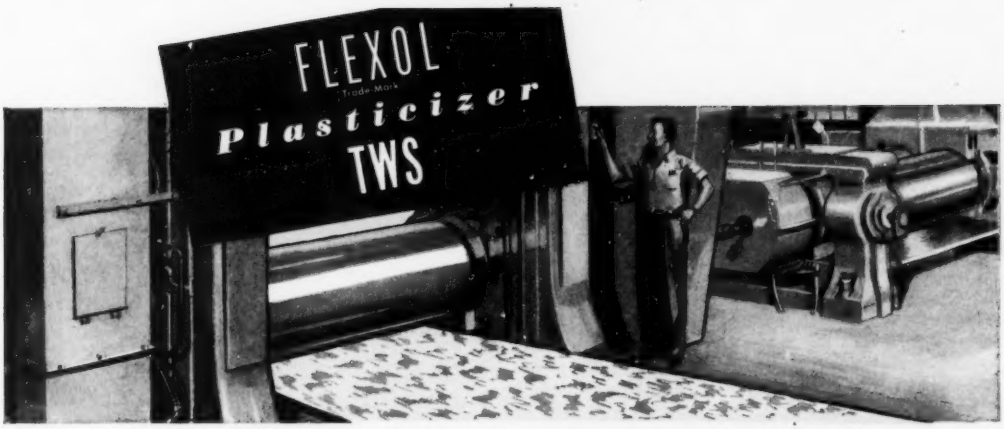

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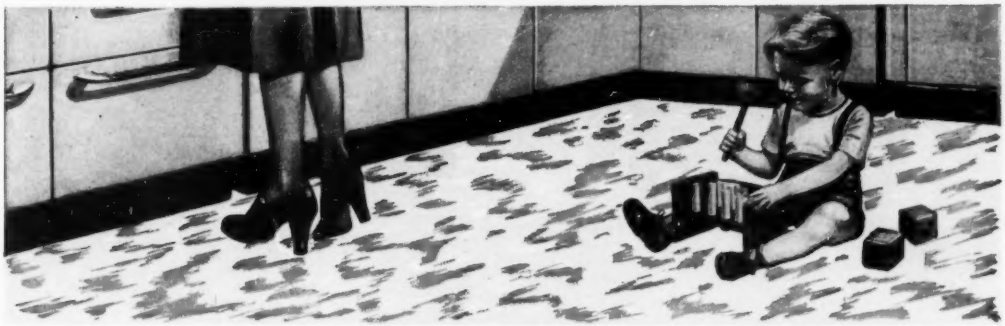

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Water, 25°C.	0.0% ←
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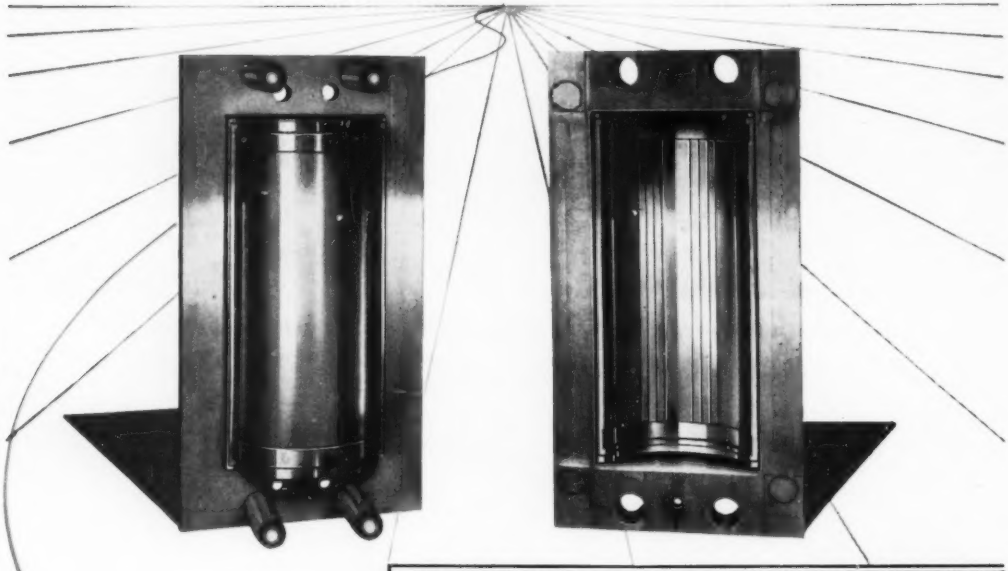

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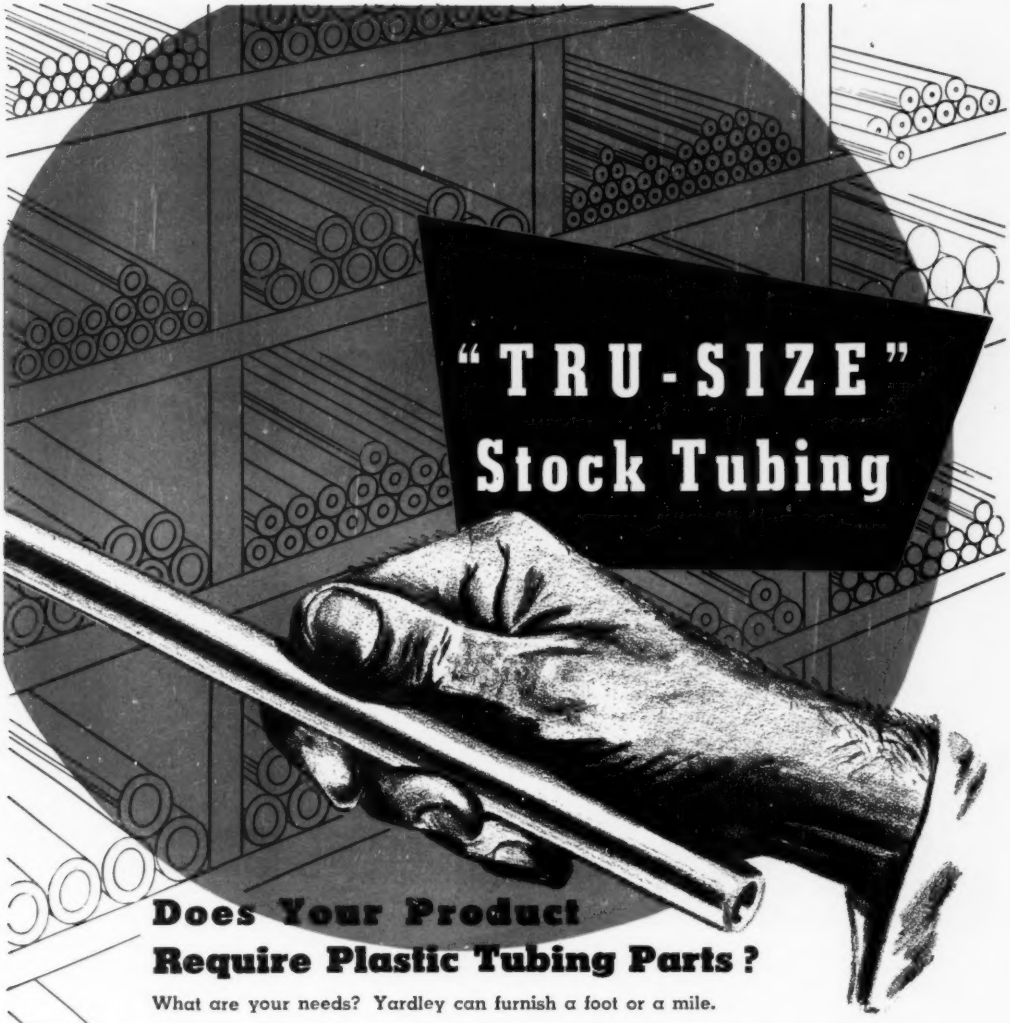

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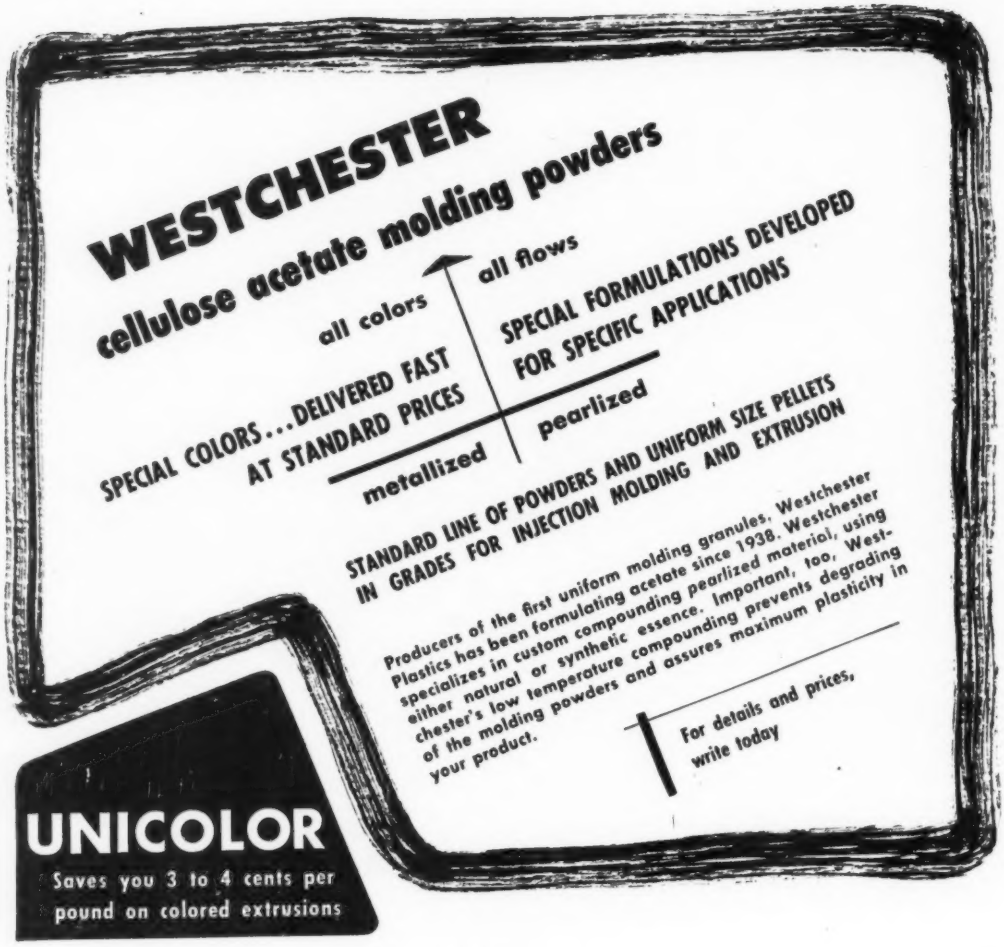
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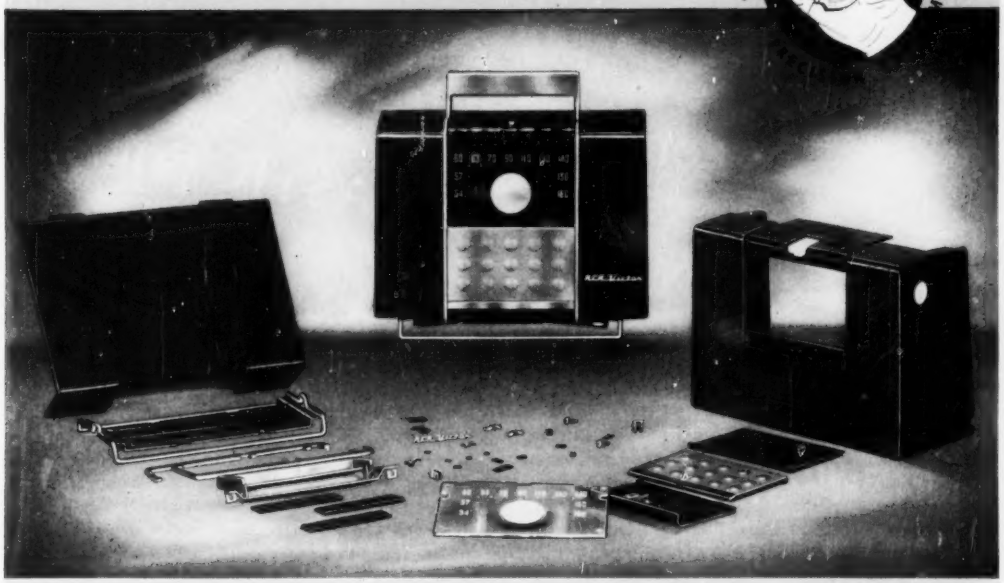

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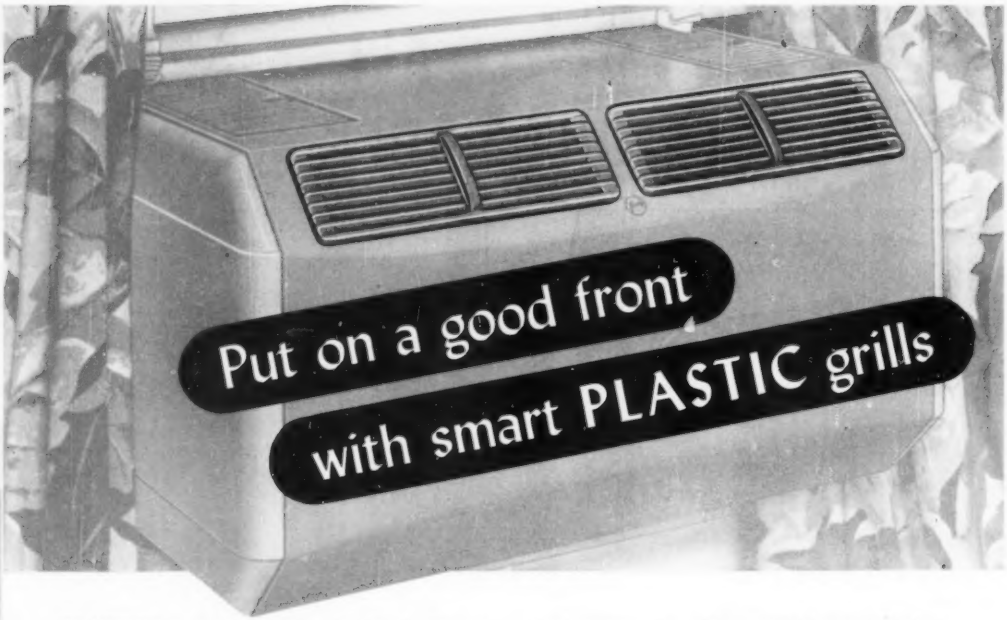
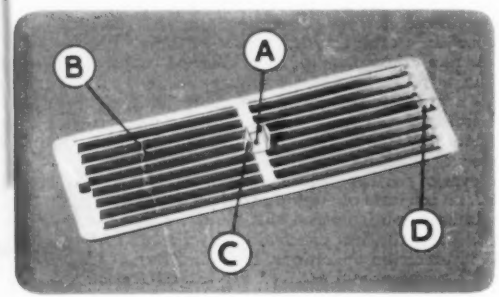


PLASTICS was selected by the York Corporation for the grills on this Yorkaire Room Conditioner. For this service, a grill must resist greater than usual humidity and temperature change . . . must retain its clean, crisp lines and new-looking gloss. Tests proved that the right plastic would meet all of the requirements for this particular application.

Aico engineers carefully consider operating conditions when recommending the material to be used in a product. They will gladly work with you to make your product put on a better front in today's market . . . to help you gain your full share of prestige and profits.



● Polystyrene is used for this grill because of its ample flexual strength . . its thermal and moisture resistance beyond the demands of this air-conditioning unit. Its excellent molding qualities insure a high rate of production from a single cavity injection mold. The material is inert to the metal insert (A) which is molded in for rapid assembly. Clever mold design forms the louvres (B) without removable core pins. Stud (C) and lugs (D) hold the grill in alignment.

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MANY THINGS ARE BETTER BECAUSE OF PLASTICS

MODERN PLASTICS

VOLUME 27 SEPTEMBER, 1949 NUMBER 1

What Your Dollar Buys in Molded Plastics

MODERN PLASTICS MODERN PLASTICS ENCYCLOPEDIA

INTER-OFFICE MEMO

To Managing Editor

From Editor

Herewith copy for lead article; September issue. No pix. Three charts, one table. Proper presentation of these charts is important because a study of them and of this article can mean the difference between profit and loss to many of our end product manufacturer-readers in the next few months.

EVERY manufacturer of durable goods today is looking at his product with critical eyes and is asking himself: "How can I make it better at the same cost? How can I make it as good for less cost? How can I make it more salable?".

The proper use of plastics can contribute much to the reduction of final product costs, improvement of quality, and increase in sales. The accompanying charts show why.

Chart A, page 76, traces the per pound price history of four thermoplastic molding plastics, three thermoset materials, five metals, and wood, over the last 10 years. The plastics materials that have come down in price have come down considerably and where plastics have advanced in price the advance has been slight compared to the price increase in other materials.

Chart B, page 77, illustrates this plastics price trend in another and more dramatic way. Taking the wholesale prices of all materials at 100 in 1939, the chart shows the index numbers of the prices of these materials for every year since. The only non-plastic material that has gone below the 1939 index is aluminum; only the thermoset plastics have fluctuated over the 1939 level—and they show a much narrower rise than the non-plastics.

Plastics not speculative

Chart B is assurance that the selection of plastics as materials for his products will not subject a manufacturer's cost structure to the emotional strains of speculative commodity markets.

As Charts A and B illustrate an important economic trend, Chart C, page 78, translates this trend into physical quantity. Plastics are light in weight and for a high proportion of manufactured products the quantitative cost of materials, rather than the cost in relation to weight, is most important. On a cubic inch basis the manufacturer generally gets a lot for his money in plastics!

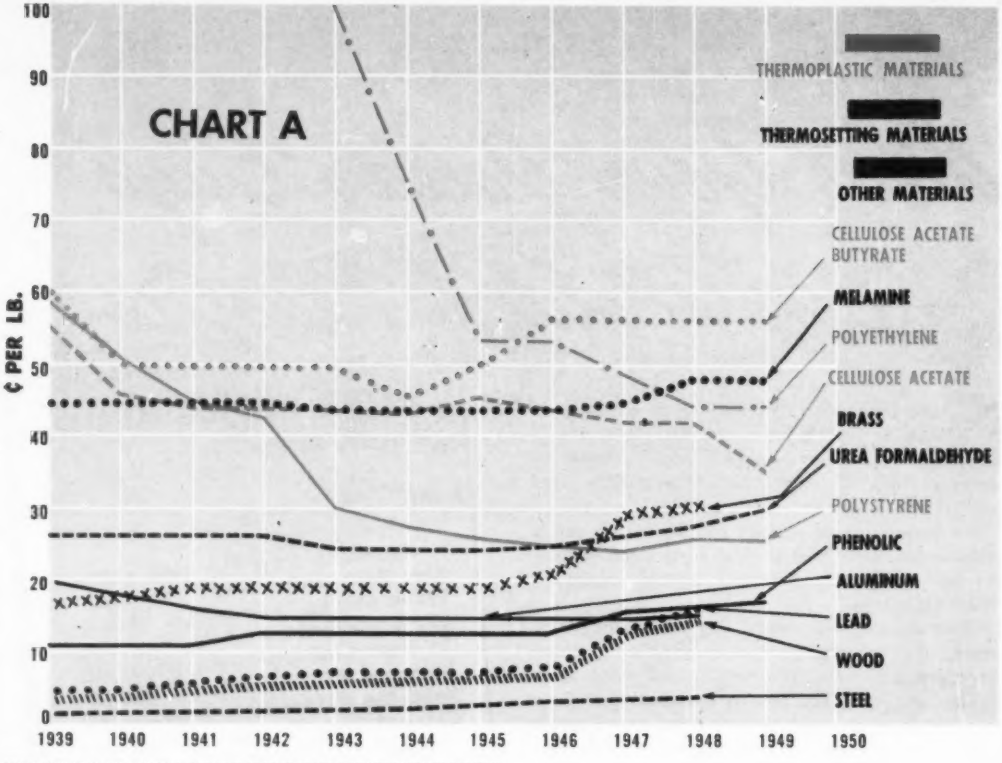
With material price trends established, and with the price advantage of plastics per cubic inch recognized, the question arises as to the ability of plastics to do a given job as well as or better than a non-plastic material for a given cost.

Strength as a criterion

Since the utility of a part depends on properties, the criterion is the *needs* of the product in strength and the type of strength needed. A mallet head needs impact strength while a fishing rod needs flexural strength. A tow rope needs tensile strengtn while a partitition needs compressive strength. In many cases where plastics are or can be used, combinations of strengths plus resistance to chemicals, moisture, abrasion, flame, and electricity are required.

Of all the strength properties required for most things of general manufacture, flexural strength

COST PER POUND OF PLASTICS AND OTHER INDUSTRIAL RAW MATERIALS



FROM "INDUSTRIAL RAW MATERIALS," SURVEY OF CURRENT BUSINESS, ECONOMIC ALMANAC FOR 1949

coupled with deflection—both elastic and permanent—are generally most important. A small comparative sample of flexural strengths is given in the table on page 77.

Strength-cost balance

An appreciation of the importance of strengths is fundamental to consideration of ways to lower product costs while improving quality and marketability. Many present products are too costly because they have unnecessary strength, or the wrong kind of strength, or strength in the wrong places! The most successful American mass-produced products are carefully balanced as to normally required strength and cost of providing same. Which is why so many of them constantly use more and more molded plastics.

So plastics have a steadily lower material cost trend, high quantitative value, and more of the most usually required strength per dollar than other product construction materials generally. Now, how do plastics rate in use costs in manufacture?

Plastics can speed production: molding is second only to stamping in speed of production, and moldings require little or no finishing.

Plastics can lower labor costs by eliminating many finishing, fabrication, and assembly operations.

Plastics can lower reject rates—and thermoplastic rejects can be remolded.

Plastics are mostly self-colored, saving finishing material costs.

Plastics can cut shipping costs; they're light in weight.

Plastics, by virtue of color, form, and feel, can improve impulse salability of the final product; by virtue of durability and satisfactory service of product, they can promote repeat sales.

Plastics parts purchased from a custom molder can lower a product manufacturer's machine tool investment, keeping him in a more liquid position and enabling him to keep his products modern.

How to use plastics

Today is a good time to consider using more plastics in any product. Here are some pointers on how to use them to best cost advantage:

Table I—Ratios of Physical Strengths of Materials of Construction and Certain Plastics to Specific Gravities and Cost

Material	*Flexural strength*	*Tensile strength*	*Specific gravity*	*Cost*	*Flexural strength Sp. gr*	*Flex. str.: Sp. gr.: Cost*	*Relative order, Flex. str.: Sp. gr.: Cost*
	p.s.i.	*p.s.i.*		*$/lb.*			
Wood—yellow pine	12,700	16,000	0.63	0.02	20,200	1,010,000	(1)
Glass	13,000	9,500	2.60	0.08	5,000	62,400	(2)
Hard rubber	12,000	7,000	1.30	0.19	9,200	48,400	(3)
Polystyrene—colored	10,000	7,000	1.06	0.315	9,400	30,000	(4)
Phenolic plastics—avg.	10,000	7,500	1.38	0.25	7,200	28,800	(5)
Cellulose acetate butyrate	7,500	5,000	1.28	0.52	14,400	27,700	(6)
Aluminum	12,000	22,000	2.70	0.16	4,400	27,500	(7)
Concrete (1:3:3)	500	200	2.31	0.009	220	24,500	(8)
Plywood (⅜ in.)	8,000	9,600	0.68	0.09	11,800	17,400	(9)
Cellulose acetate molding powder	8,000	6,700	1.32	0.40	6,100	15,200	(10)
Structural steel—0.3% carbon	33,000	85,000	7.85	0.033	4,200	12,600	(11)
Copper	15,000	47,000	8.89	0.16	1,700	10,600	(12)
Nylon	14,600	50,000	1.14	1.60	12,800	8,000	(13)
Methyl methacrylate	7,000	5,000	1.18	0.80	5,900	7,400	(14)
Phosphor bronze	12,000	120,000	8.81	0.345	1,400	4,100	(15)
Lead	1,825	2,700	11.34	0.12	160	1,300	(16)

Data courtesy Plastics Div., Monsanto Chemical Co.

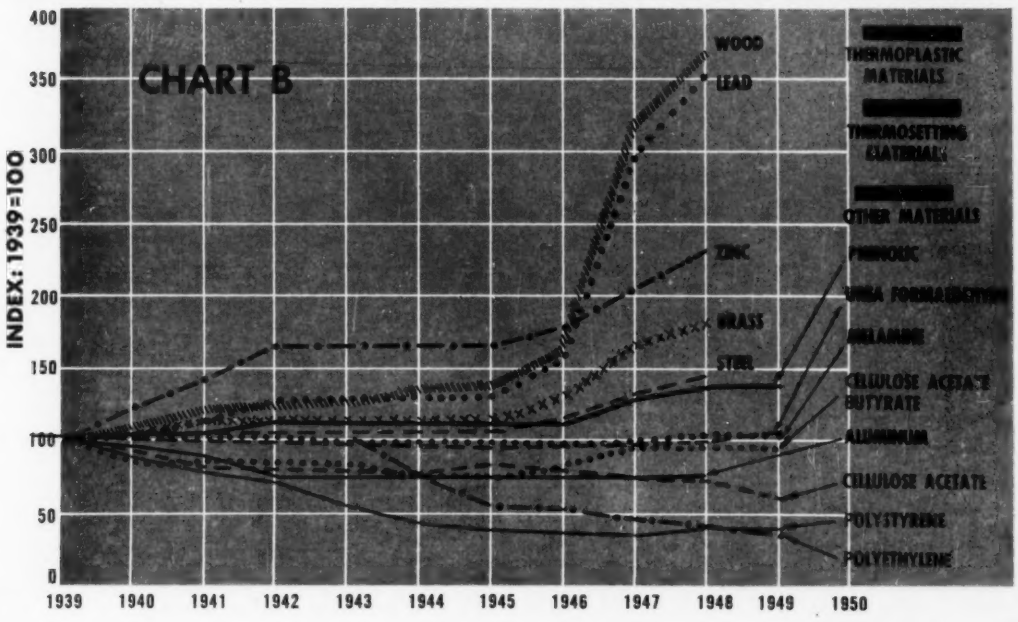
1) Invest in good design and engineering. Simplify styling. Keep away from undercuts and "trick" jobs which require more expensive molds, slow up cycles, and cause rejects.

2) Know what strengths are required and where, and see that the design puts them there. A thick, "beefed-up" section may be no stronger than a properly bossed thin section, properly molded.

3) Know what weight is best for the finished product. Many things are still unnecessarily heavy. If weight is required it may pay you to use a plastic for cubic inch cost advantage and another material to provide no other function than weight.

4) Use combinations of plastics and other ma-

INDEX NUMBERS OF WHOLESALE PRICES OF PLASTICS AND OTHER INDUSTRIAL RAW MATERIALS



terials to secure the color, form, and strength effects desired.

5) Use standard colors. You'll get quicker material delivery, more flexible inventory, and lower material costs. You can split shipments of standard colors in some materials. Standard colors have been pretested for sales appeal. Your dealer inventory problem will be easier, too.

6) Don't prejudge a possible application of plastics by the appearance and properties of a product in any other material. There is seldom any cost or sales advantage to be gained by copying a design for another material into plastics. If your use of plastics is based on function you'll get a better product—and today you'll probably get it at lower cost!

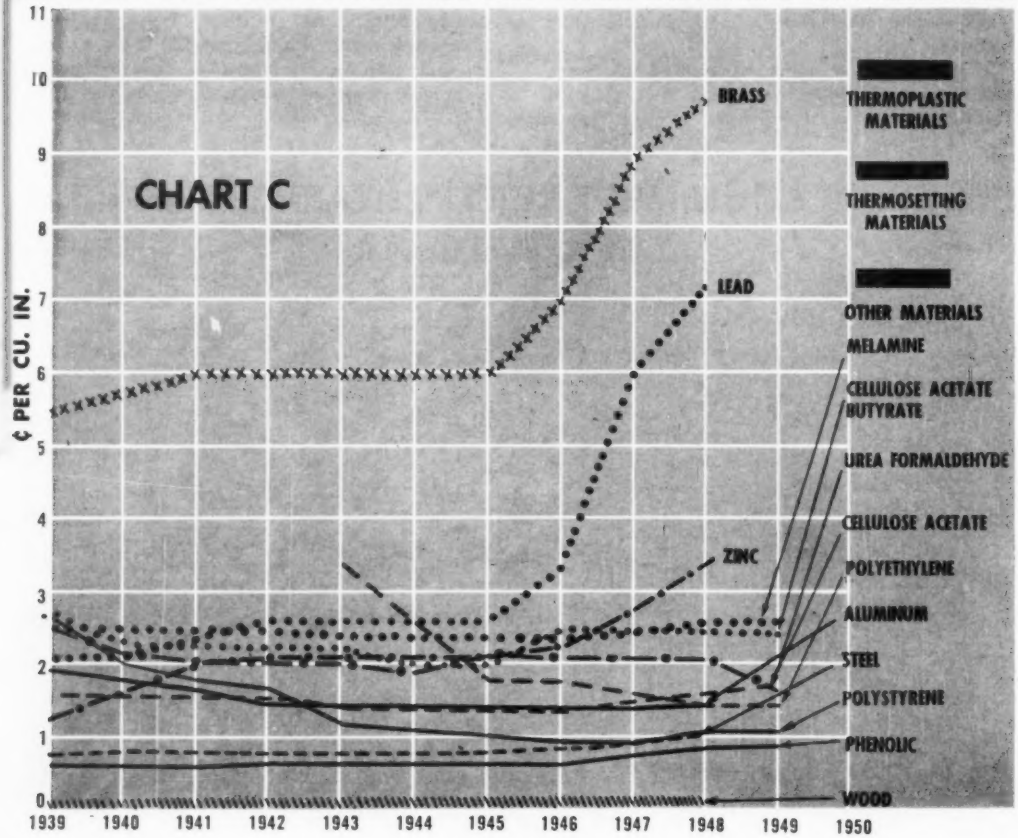
Acknowledgments

The editors wish to thank the following who assisted in the preparation of this article:

E. D Kennedy, advertising manager, E. L. Hobson, manager thermoplastic sales, and Robert Crawford, sales research, Plastics Div., Monsanto Chemical Co. C. W. Blount, vice-president and general sales manager, C. A. Norris, assistant general sales manager, and Steven J. Wilson, publicity department, Bakelite Corp. Dennis Guthrie, advertising manager, Tennessee Eastman Corp. Gerald C. Johnson, industrial designer. J. R. Hoover, vice-president, and M. W. Osborne, Jr., advertising department, B. F. Goodrich Chemical Co. A. F. Randolph, assistant to director of sales, Plastics Dept., E. I. du Pont de Nemours & Co., Inc. W. H. MacHale, advertising manager, Plastics Div., American Cyanamid Co. C. F. Elliott, public relations department, Chemicals Div., The Glenn L. Martin Co. L. S. Meyer, manager, Plastics Div., Western Products, Inc. Eugene Lux, industrial designer. Miss Harriet Raymond, ass't. advertising manager, Plastics Div., Celanese Corp. of America.

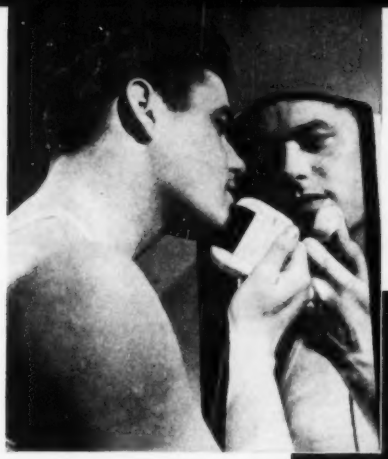
The basic charts used in this article were developed by the Plastics Div., Monsanto Chemical Co.

COST PER CUBIC INCH OF PLASTICS AND OTHER INDUSTRIAL RAW MATERIALS



Radically New Shaver ...

. . . has 17 plastic parts made of 4 materials



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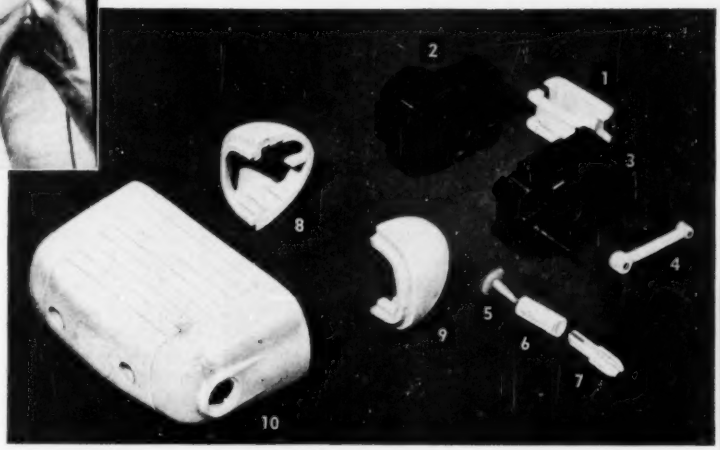


Exclusive of carrying case, shaver with wide cutting head contains the following plastic parts: 1) two-piece acetate field coil bobbin; 2) and 3) phenolic motor bearing blocks with metal inserts; 4) nylon connecting rod; 5), 6) and 7) nylon insulating sleeve for male connecting plug, wedge and shell for female plug on cord; 8), 9) acetate housing ends; 10) main housing piece of acetate

IN its new Model W Shavemaster, Sunbeam Corp., Chicago, Ill., one of the pioneer producers of electric razors, has departed completely from the usual electric shaver design. The Model W, with its unique carrying case, has 17 plastic parts made of four different materials: flame-resistant acetate, cellulose propionate, improved impact phenolic, and nylon.

The wide cutting head and completely new styling of the Model W, designed to give much faster shaving, are made possible by a fundamental departure from conventional electric razor construction. In this model, the brush-type AC-DC motor is mounted with its axis parallel to the shaving head instead of at right angles to it. The revised styling approach permits the use of a shaving head twice as large as that on the previous Shavemaster model, and a compact housing which fits the hand naturally and comfortably. The super-sized metal comb, only 0.002 in. thick and perforated with 1750 openings, provides a total of more than 28 million individual shaving actions per minute.

Engineers of Sunbeam Corporation worked closely with Chicago Molded Products Corp., the molder, to make certain that all plastic materials in the new model were specifically suited to the application and would provide fine appearance, durability, and smooth performance in the finished shaver. Molding operations on the various plastic components are handled by Chicago Molded; all assembly operations are done by Sunbeam.

The motor housing and end pieces of the Model W are injection molded of grey cellulose acetate, a material which successfully proved its toughness and durability in the previous model. In order to meet Underwriters' requirements, Lumarith XF, a flame-resistant type of acetate, was specified. Molded with adequate wall thickness, the three housing parts are internally ribbed for added rigidity and easily withstand all the normal hazards to which an electric shaver may be subjected.

Acetate housing, phenolic bearing blocks

The main housing part, largest plastic piece in the shaver, is 3½ in. wide, 1 5/16 in. thick, and 2 in. deep. It has two cored openings at the closed end for recessed assembly bolts and a third opening at the side through which the cord plug is inserted. A series of ridges on both sides of the case provide an attractive design and afford a firm finger-grip on the shaver.

The field coil bobbin, which is made in two parts to facilitate assembly operations, is also molded of Lumarith XF. The two halves of the bobbin are so designed that they slip together and interlock at each end, thereby forming a unified, permanent assembly.

The two motor bearing blocks are among the most

important mechanical features of the new shaver. Requirements for these parts included strength, heat resistance, electrical insulation, stability, and rigidity to insure accurate, permanent alignment. These parts must support the thrust of the rapidly revolving motor. They are produced by advanced plunger molding methods, utilizing improved-impact Bakelite cotton flock filled phenolic material. Metal bushings which support the motor shaft at each end and the male connecting plug are molded into these blocks as inserts. Threaded cores which receive assembly bolts are also molded in.

Nylon connecting rod

From the functional standpoint, the most interesting plastic part in the new Shavemaster is the diminutive connecting rod which transmits the mechanical motion from the motor crankshaft to the oscillating cutting blade. Since the motor operates at high speed, it was desired to keep the connecting rod as light as possible to minimize strain and vibration.

Exhaustive tests of available materials, equivalent to years of regular service, ultimately resulted in the choice of molded nylon for this part. Weighing only one-eighth as much as metal, the nylon connecting rod possesses remarkable strength and has the unique ability to withstand high speed operation at elevated temperatures with an absolute minimum of lubrication. This made it possible to mold the entire rod, with its bearings, as an integral unit. A tiny molded-in core about the diameter of a common pin runs the length of the connecting rod. Filled with lubricant during the assembly operations, it conveys to the bearings at each end the almost negligible amount of lubrication required for years of trouble-free operation.

The other three nylon parts used in the Shavemaster include the insulating sleeve for the male connecting plug and the wedge and shell components for the female plug part, which are later bonded securely to the electric cord. Here again, the toughness, light weight, excellent insulating properties, and heat resistance of nylon were important factors.

Cellulose propionate case

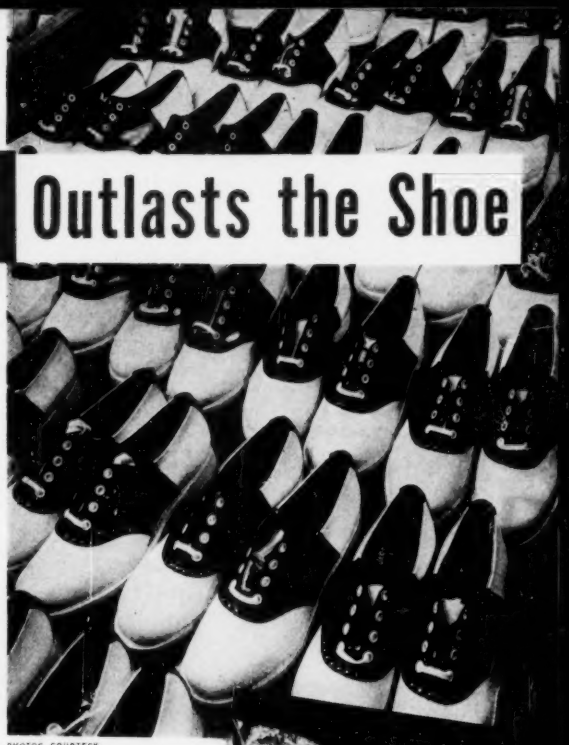
Of exceptional importance from the merchandising standpoint is the plastic case in which the Model W is sold. Functional as well as attractive, the case measures 5⅛ in. wide by 4 13/16 in. from front to back by approximately 2¼ in. high when closed. Beneath the hinged, snap-closure lid is a compartment into which the razor (with cord removed) fits snugly. The cord itself—always an awkward problem in packaging electric shavers—is coiled on a concealed plastic reel which snaps into position on the underside of the carrying case. The reel is molded in two parts and cemented.

To use the razor, one has but to remove it from the case, remove the cord reel from the bottom of the case, unwind the cord from the reel, and plug it into the shaver and electric outlet. After the shave is completed, only a few seconds are required to disconnect the cord, insert the two terminals in the proper reel slots and wind it up, and snap the reel back in position.

When molds for the case were completed, samples from several materials were molded and subjected to vigorous tests. The material eventually chosen was Forticel cellulose propionate, first, for its exceptional toughness, and second, for the outstanding luster and beauty of the molded parts. The case is molded in a variegated brown and black cellulose propionate and the words, "Sunbeam Shavemaster" are hot-stamped in gold on the inner surface of the case lid.

When packed, shaver rests in top of molded cellulose propionate case. Propionate cord reel snap-fits into underside of case. Slots in reel hold cord terminals

VINYL WELTING Outlasts the Shoe



PHOTOS COURTESY THE GLENN L. MARTIN CO.

SHOE manufacture was revolutionized in the 1870's with the advent of the Goodyear machine stitcher—introducing the welted shoe. But welting—the narrow strip to which both the upper and the sole are joined—has posed a perennial problem to the trade. Leather, although universally used, has never been wholly suitable as a welting material. Leather welting lacks uniformity, since its production involves a splitting of the hide, and continuous lengths are limited by the size of the animal.

As an answer to the shoemaker's problem, Wright Batchelder Corp., Boston, has developed a vinyl resin-base welting. The new welting, distributed under the trade name Dryseal by the Compo Shoe Machinery Corp., Boston, is produced in a continuous strip extrusion process by The Okonite Co., Passaic, N. J. Marvinol vinyl resin is used.

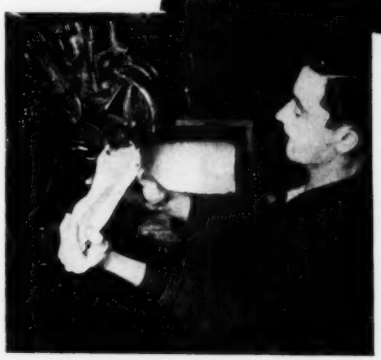
About 25 leading shoe manufacturers have adopted the vinyl resin-base welting and more than 18,000,000 pairs of shoes have already been made with that welting. The manufacturer claims that the vinyl resin-base welted shoes have superior wearing and waterproof qualities. The welting is said to outlast the shoe.

Vinyl welting is used in sport shoes. Magnified view of cross-section of shoe shows how upper is sewed between insole and T-shaped vinyl welting (arrow)

Plastic welting costs less

The plastic welting is available to the shoe manufacturer at a saving of several cents per yard, and its stitch-tear strength permits it to be resewed a number of times. A tighter seam results from the fact that it retains its dimensional stability, neither shrinking nor cracking with age. It does not lose its flexibility even under temperature conditions as low as -20° F. It is extremely resistant to the action of oils, acids, and alkalis.

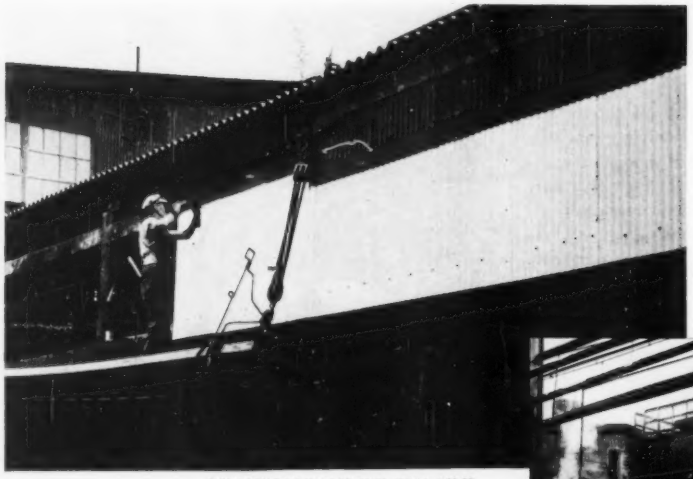
Marvinol-base welting comes in 250-ft. lengths, obviating ugly laps and splices at the side of the shoe. It is uniform in texture and in cross-section, the latter to within 0.004 inch. A wide choice of colors is available, including white, black, brown, red, and green. Furthermore, unlike leather, edge-trimming of the welt presents no color problem because the pigmentation runs evenly throughout the material.



Vinyl welting is first sewed on during inseaming operation. Note the spool of vinyl welting behind operator

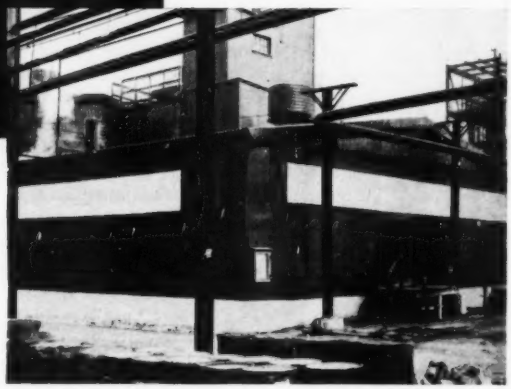
Letting Light In

Acrylic sheets and polyester-glass mat laminates have both proved suitable for sky-lights and side-lights in corrugated buildings



To provide more light inside building, corrugated white translucent acrylic sheets measuring 33 by 51 in. are screwed directly to structural members of building. They take the place of metal sheets

By overlapping the metal sheets below and being in turn overlapped by metal sheets above, acrylic glazing is made completely waterproof. Cost is said to be in line and replacement expenses cut



PHOTOS ABOVE AND RIGHT COURTESY ROHM & HAAS CO.

MANY windows in corrugated buildings are designed solely to admit light, and are never used for ventilation. The simplest way to provide the necessary light would be to have sections of the building wall which are translucent instead of opaque. That direct method of providing sky-lights or side-lights is now possible with corrugated plastic sheet materials.

Acrylic sheet

An example of acrylic sheet glazing is found in the Hypo Building, Bridesburg, Pa. The building itself is made of Robertson metal. The side-lights are made of ⅛-in. thick white translucent Plexiglas sheets corrugated to the same frequency and amplitude as the metal. The 33 by 51-in. sheets are screwed directly to the structural members of the building. They overlap the metal sheets below them and are overlapped by the metal above them. Thus the installation is completely weatherproof.

Plexiglas was installed in the Hypo Building to replace metal sash which had repeatedly rusted out. The initial cost of the plastic was considerably higher than glass, but the cost of the plastic installed is comparable to the cost of the glass plus sash plus installation. Replacement expenses are expected to be considerably reduced with the plastic side-lights.

The material manufacturer claims that Plexiglas can be used for sky-light installations in corrugated buildings at an average cost of about $2.25 per sq. ft. as compared with approximately $3.25 per sq. ft. for the complete installation when glass is used.

Polyester-glass mat laminates

Another type of plastic material which can be used for glazing in corrugated buildings is a laminate made of Fiberglas mat and Laminac polyester resin. The corrugated translucent material, known as Alsynite, is made by Allied Synthetics Co., San Diego, Cal. It is available with either 2⅝ or 1¼-in. corrugations in various sizes of sheets. The material is between 0.050 and 0.060 in. thick and weighs only 7½ oz. per square foot.

Alsynite sheets can be cut easily with hand or power saws, shears, or a knife. They can be screwed or nailed in place, or can be cemented with a special translucent mastic supplied by the manufacturer. The mastic can also be used for sealing joints between adjacent sheets of the material.

Reported strength tests by the San Diego Testing Laboratory show that Alsynite sheets installed according to the manufacturer's recommendations will withstand roof and wind loads "in excess of twice the usual code requirements" without failure and that workmen can move about on an Alsynite roof without danger.

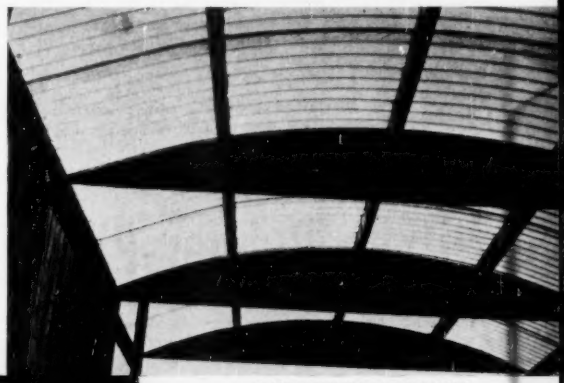
In addition to industrial glazing applications, Alsynite can be used for decorative applications in stores, homes, and offices. It is available in aquamarine, yellow, maize, green, rose, and opalescent.

Corrulux, a translucent corrugated sheet material made by Corrulux Corp., Houston, Texas, consists of Fiberglas mat and Laminac, Selectron, and other polyester resins. It is available to match 1¼-in. corrugated metal, 2½-in. corrugated metal, 4.2-in. corrugated asbestos, and 2½-in. corrugated metal curved sheets for roofs of Quonset-type buildings.

The material can be sawed, nailed, bolted, or drilled. Thus it can be handled by relatively unskilled labor. It is claimed that between 30 and 50% of the cost of day-lighting corrugated buildings can be saved because of lowered labor costs and the elimination of framing and other specialized fittings. In sky-lighting applications, for example, the total cost of Corrulux installed is claimed to be less than $1.25 per sq. ft. as against costs as high as $4,00 per sq. ft. for sky-lights of glass, framing, and flashing.

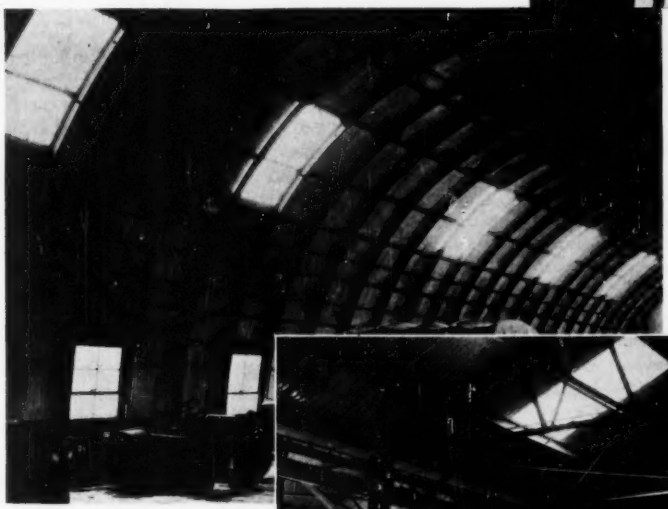
COURTESY ALLIED SYNTHETICS CO.

Polyester-glass mat laminate sheets which can be nailed, cemented, or screwed in place, admit light in this ceiling



COURTESY OWENS CORNING FIBERGLAS CORP.

Above: Plastic sheets are fastened to steel rafters in the covered entrance to a mill by metal rods which go under rafters. Nuts on rod ends hold the sheets



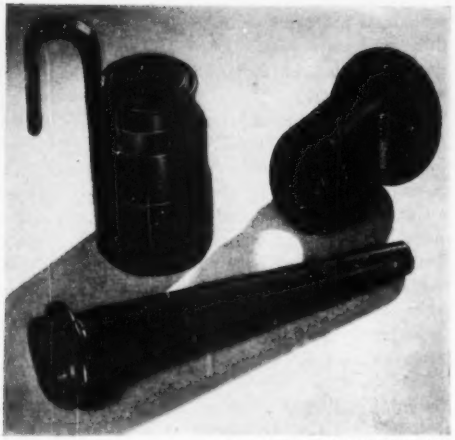
Left: Double sheets of polyester-glass mat laminate in Quonset. Sheets fit in with metal siding without extra framing or work, thus cutting construction costs

PHOTOS LEFT AND BELOW COURTESY CORRULUX CORP.

Right: Pairs of polyester-glass mat sheets nest with 2½-in. corrugated aluminum roofing in this factory

COURTESY B. F. GOODRICH CHEMICAL CO.

Handles for electrical tools are molded of nitrile rubber-phenolic blend by Connecticut Hard Rubber Co., New Haven



COURTESY DUREZ PLASTICS & CHEMICALS, INC.

Uses of rubber-phenolic mixture include non-spill paint pot, bottle chute for drink vending machine, blower nozzle

Nitrile Rubber-Phenolic Blends

by R. C. BASCOM*

The combination makes a tougher plastic, a reinforced rubber, or a strong adhesive

THE importance of blended or tailored plastics with their valuable combinations of properties has not been overlooked by rubber and plastics companies and especially noteworthy has been the work done with nitrile rubber-phenolic blends by certain companies in these two industries.

Phenolic resins are inherently strong, hard, but relatively brittle mass condensation polymers of phenols and aldehydes. They are made by interrupting polymerization at a point where the resin is still fusible, mixing with fillers and lubricants and then molding into finished products by completion of the interrupted reaction. The molding cycle is extremely short and the molded finish is excellent. Fillers are fibrous in nature and are usually cellulose in a wide variety of forms.

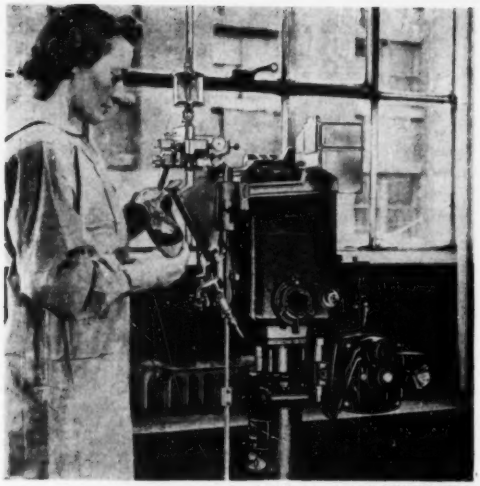
Rubber, on the other hand, is soft, extensible, tough, and extremely adaptable. A straight chain unsaturated hydrocarbon polymer, its characteristics are dependent upon the amount of sulfur used for vulcanization. Approximately 3% sulfur is used for soft vulcanized products and between 30 to 50% for hard rubber goods. Hard rubber combs, made from just rubber and sulfur, possess about 11,000 p.s.i. tensile strength, with about 6% elongation. Battery boxes, on the other hand, contain less than 20% rubber and are heavily loaded with clay and asphalt. Fillers normally employed in the rubber industry are of small particle size.

Emphasis in phenolic molding plants has been placed on molding skill, made possible by short cure time and highly efficient mold engineering. Rubber companies have, in turn, emphasized compounding skill, purchasing materials, and molding their own compounds in each individual factory.

It has been only natural that in view of the above, both industries have looked longingly at each other, both for end-product business and for the combination of physical properties so obviously inherent in a blend of these two materials.

The rubber industry wanted the hardness, strength, and short cure of the resins; the phenolic industry needed some of the toughness inherent in an elastomeric polymer. However, blending of natural rubber and phenolic resins proved a hopeless failure. The two materials were just not compatible and blends resulted in products of non-uniform composition with physical properties degraded considerably by the addition of even small amounts of either component. The lack of compatibility was not surprising, since the two materials are resistant to each other's solvents. Natural rub-

*Technical service manager, Hycar and Rubber Chemicals, B. F. Goodrich Chemical Co.



COURTESY COMPO SHOE MACHINERY CORP.

Operator is shown applying shoe cement based on nitrile rubber and phenolic. It is used to bond soles to uppers

ber, soluble in petroleum solvents, is not affected by ketones nor alcohols, both of which are solvents for phenolic resins.

With the manufacture of nitrile rubbers, known under such trade names as Hycar, Paracrile, Butaprene, or Chemigum, this compatibility picture changed completely. These rubbers are soluble in ketones, insoluble in aliphatic solvents, and there is a mutual compatibility between nitrile rubbers and phenolic resins.

B. F. Goodrich Chemical Co. undertook a serious study of Hycar-phenolic blends in 1944. The first investigation work consisted of making a series of compounds using 100 parts Hycar OR-25 with sufficient sulfur and accelerator to cure to a soft stage, and adding 50 parts of phenolic resin. All in all, probably 50 different phenolic resins were investigated.

Resin reinforces nitrile rubber

It was soon noticed that while almost all of the resins tested were soluble in Hycar when uncured, few of them reinforced the rubber to any appreciable degree. However, one resin was outstanding in its ability to reinforce, Durez 12687, manufactured by Durez Plastics & Chemicals, Inc. As a result, most of the work conducted by Goodrich has been with this resin.

Test results have shown that there is not much advantage to be gained by vulcanizing nitrile rubber when it is in the minor phase. But in those blends where there is more nitrile rubber present than phenolic, it is very important that sulfur be present and the rubber be completely cured. Vulcanization of Hycar to a soft stage results in increased tensile strength, slightly lower impact, and slightly higher hardness. However, when the rubber phase is carried to hard rubber, all properties suffer markedly.

Tests also show that both cellulose and mineral type fillers are excellent in rubber-phenolic mixtures. Through the use of nitrile rubber, the phenolic compounder is able to increase his filler content substantially, thus lowering costs without sacrifice of toughness or moldability.

A recent commercial application of a Hycar-phenolic blend is General Electric's specialty molding powders GE 12446, 12487, and 12489. These materials, which contain wood-flour filler and phenolic resin modified with Hycar, have appearance, preformability, moldability, and heat resistance similar to general purpose wood-flour filled phenolics and possess, in many applications, the toughness and resilience of cotton flock and rag-filled materials. Black and brown are available; other dark and mottled effects are contemplated. According to General Electric, when subjected to repeated blows in falling-ball impact tests, parts molded from these powders show more than five times the endurance of general purpose wood-flour filled phenolics. After cracking is first noticed, many additional blows are required to cause failure; ordinary wood flour-

The Author: **Roger C. Bascom has been devoting considerable time and energy in recent years to the improvement of the impact resistance of phenolic molding resins by the addition of Hycar nitrile rubber. He served for six years as Technical Service Engineer and Sales Representative in New England for Hycar and Rubber Chemicals. Recently he was appointed Technical Service Manager for the Hycar group and is at present located in the headquarters office of B. F. Goodrich Chemical Co. in Cleveland.**

Mr. Bascom was graduated from Northwestern University in 1930 with a B.S. in Chemical Engineering. He has been associated with a number of companies in the rubber industry, including Converse Rubber Co., Malden, Mass., Rubatex Products, New York, and Standard Products Co., Port Clinton, Ohio. He is a member of The American Chemical Society and was active in the formation of the Connecticut Rubber Group.

filled materials crack and fail simultaneously.

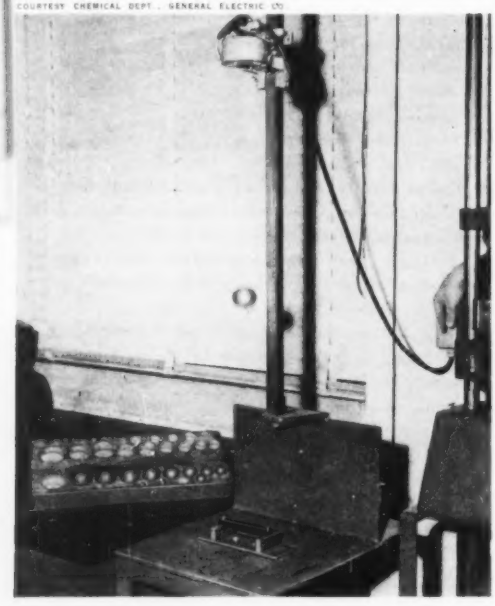
The internal resilience imparted to these compounds by their rubber component enables molded parts to withstand abuse in assembly, shipping, and handling—punishment which would often result in cracking and failure if general purpose wood flour-filled phenolics were used. This resilience also enables these materials to be molded in thin sections around large inserts and around inserts subject to vibration and flexing, without danger of failure in service. Parts molded from these compounds do not fail when subjected to rapid temperature changes from —40 to +120° C. Their continuous heat resistance is comparable to that of general purpose wood flour-filled phenolics. In addition, they have low density, excellent finish, high gloss on long-draw or transfer molded parts, and an ability to hold self-tapping screws tenaciously.

The commercial acceptance of rubber phenolics has developed slowly along three distinct lines: adhesives, rubber modified with resins, and resins modified with rubber.

Adhesives made of nitrile rubber modified phenolic resins in solution are in production and available from most adhesive manufacturers. They are used for attaching soles in shoe manufacturing, for adhesion of automotive brake linings to brake shoes, and other industrial uses. The Compo Shoe Machinery Corp. has produced a cement which, according to the company, will stick to leather, cloth, cork cardboard, leatherboard, fiberboard, paper and other porous materials, wood, masonite, nitrile rubbers, pvc polymers and copolymers, nitrocellulose, cellulose acetate, urea and phenol aldehyde resins, nylon, polyvinyl alcohol, iron, brass, aluminum, tin, chromeplate, and glass. It has poor adhesion to natural rubber, butyl rubber, and polyethylene.

Test bar molded of nitrile rubber-phenolic compound has five times the endurance of wood-flour filled phenolic

COURTESY CHEMICAL DEPT., GENERAL ELECTRIC CO.



The rubber industry has found use for phenolics as modifiers for nitrile rubbers. The addition of relatively low amounts of phenolic resins to rubber results in a very high degree of reinforcement, especially in tear and abrasion resistance. An example of this type is a small part used by Compo to hold the toes of shoes in a cementing machine. Present parts made from Hycar-phenolic show no wear after 1½ years of service; the former natural rubber part reinforced with tire cord failed completely in six weeks. Shoe soles and basketball covers are only two examples of rubber parts in which the reinforcing effect of phenolic resins is utilized.

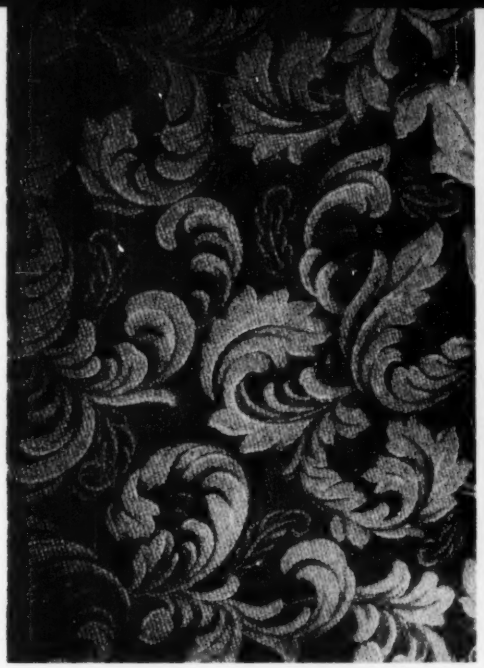
Although commercial use of nitrile rubber to modify phenolic molding compounds has been slow, it is believed that the pace will soon be accelerated. The factors which made the rubber industry first reject phenolic molding compounds have delayed commercial acceptance of these blends. The particular skills and equipment present in the rubber industry were not adaptable to this work. There are comparatively few plants in this country with the particular combination of know how and equipment necessary to handle this mongrel blend.

Fine powder blends readily

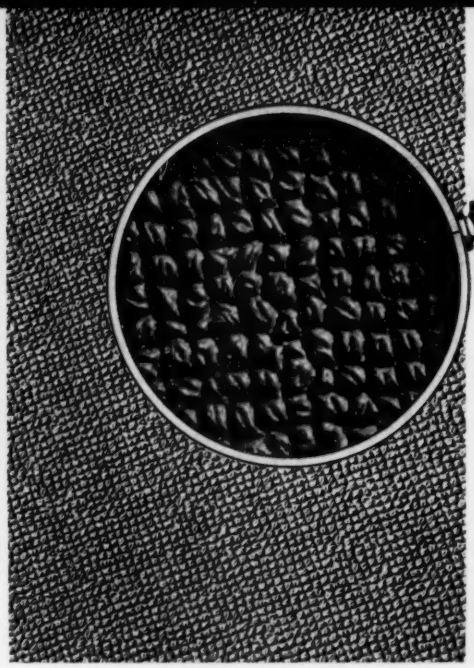
The physical state of crude nitrile rubber made long mixing cycles necessary so that the phenolic molding compound manufacturers could not readily fit it into their mixing cycles. In order to overcome that difficulty, B. F. Goodrich Chemical Co. developed a finely divided Hycar OR-15 powder. This powder is readily blended with the phenolic resin and fillers before the mixing operation so that the normal phenolic milling operation is not affected.

Nitrile rubbers are relatively expensive so that compounds containing them cost more than general purpose phenolics. This factor can only be overcome by finding applications where the unique properties of this type of compound adequately justify the increased cost. Such applications as football cleats, tool handles; and molding thin walls around inserts are typical. The newer concept of very high loading of relatively cheap pigments has not been thoroughly investigated.

With the development of these blends the rubber industry has presented a new compounding tool to the phenolic industry. With nitrile rubbers the phenolic industry is able to make tough horny compounds that had previously not existed. This new approach should enlarge and expand the markets for phenolic resins in this country.



Carpet-like floor covering is made by deep-embossed calendering of clear vinyl over colored or printed fabric



Pattern to simulate solid-colored carpeting is deeply embossed, as is evident in section under magnifying glass

Carpeting from a Calender

INSPIRED by Ephraim Freedman, chief of Macy's Bureau of Standards and well known for his positive approach to plastics applications, and encouraged by months of successful use testing on Macy's selling floors, Southbridge Plastics Inc., New York, has placed its Vinatred vinyl carpeting on the market. The product is made by deep-embossed calendering of clear Geon vinyl chloride over colored or printed fabric. It comes in rolls 36 in. wide and in seven standard colors. It is the maker's intention to produce several different types of embossing for different effects as well as custom-decorated material on special order.

The new carpeting is laid over 3/16 or 1/4 in. sponge rubber, the sponge rubber being applied to concrete or wood floors by means of standard linoleum adhesives and the vinyl carpeting being applied to the top of the sponge rubber with a special adhesive developed by Southbridge. Professional laying is recommended. The flooring is available in 0.070, 0.050 and 0.040 in. thicknesses. Since the colors are either neutral or high-style, the carpeting is suggested for use wherever constant traffic is met—department stores, banks, hotels, hospitals, restaurants, show rooms, and homes. Being nonporous the flooring cannot absorb dirt and may be cleaned with a vacuum or mop without shrinkage or loss of color. The sponge rubber cushion makes it non-conducive to fatigue in people walking or standing on it, while the embossed surface provides a sure footing.

Flame resistant

The material is flame resistant; it will not support combustion. Tests indicate that it will withstand temperatures from tropical heat to 20°F. and that it will stand up under abrasion and wear conditions far in excess of ordinary hard surface floorings.

The company has applied for a patent on a heat sealing machine which can automatically butt seal the edges of the laid carpeting, providing a completely moisture-proof and dust-proof floor. Plans for sale or lease of the machine or rights to it have not been finalized, but it is expected to be in production late this year.

The company's Vinalon, an unsupported vinyl upholstery material, and Vinalure, a handbag material, have been on the market for some time.

Plastics on the Wall

Second of two articles surveying the field of plastic wall coverings

COURTESY C. F. CHURCH MFG. CO.

Bathroom walls are surfaced with Church polystyrene tile in two sizes. Note feature strips on wall above the tub

BECAUSE of its unlimited color range, moderate cost, ease of application, and satisfactory service characteristics, polystyrene wall tile has already made considerable progress in the construction field for original installations, particularly in kitchens and bathrooms. It also has strong appeal for those wishing to give existing kitchens and bathrooms something new and different in the way of color treatments.

Dozens of molds are now in existence and the product, with various design modifications, is being turned out in large volume by molding plants all over the country. The standard size for polystyrene tile is 4¼ by 4¼ in., supplemented by the cap strips and feature strips required for proper installation. Some manufacturers also offer special sizes such as 8½ by 8½ in. and 8½ by 12¾ in., permitting interesting decorative treatments. Colors available range from deep, rich tones to light pastels and include solid colors, marbleized effects, and even metallics.

The light weight of plastic wall tile—approximately ½ lb. per sq. ft., compared with 3 to 18 lb. for tiles of other materials—permits it to be installed on practically any type of sound, smooth wall surface without supplementary bracing or strengthening. The tiles are put up with special types of mastics applied by means of a notched trowel. Development of satisfactory adhesives which would provide the required bond, would not craze the tile, and would not show through tiles with lighter colors was a major factor in bringing plastic tile to its present state of acceptance. Several good special mastic cements are now available for the purpose.

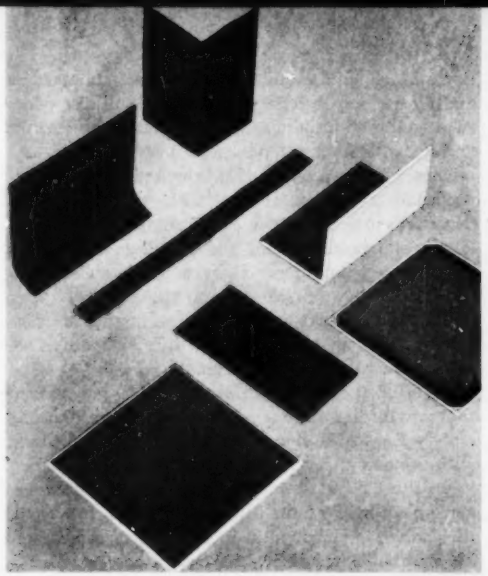
Polystyrene tile, when properly installed, meets normal service conditions without difficulty—with one or two exceptions as noted below. Its very low water absorption is a distinct advantage in bath and kitchen installations. Although slight fading occurs under prolonged exposure to direct sunlight, color changes are said to be negligible in standard interior installations.

The tile can be kept clean and sparkling with an occasional soap-and-water washing. Due caution must be exercised if the original appearance of the tile is to be maintained. For example, the use of abrasive cleaners must be avoided, as well as solvents such as kerosene, gasoline, benzine, etc., which may damage the face of the tile. Dust pickup can be minimized by the application of suitable destaticizing agents, either by the tile manufacturer or after installation.

Installation of polystyrene tile is not recommended

The first of these two articles, published last month, described a number of different types of flexible wall coverings. The present article deals mainly with wall tiles, high pressure laminates, and other more or less rigid coverings.

In both the present article and the one published last month, no attempt has been made to describe every available wall covering. Examples have been selected from the various groups with the thought that the described properies will indicate the potential scope of other wall coverings within each group.



Polystyrene Hako tile is available with molded inside and outside corner tiles, cove base tiles, and feature strips

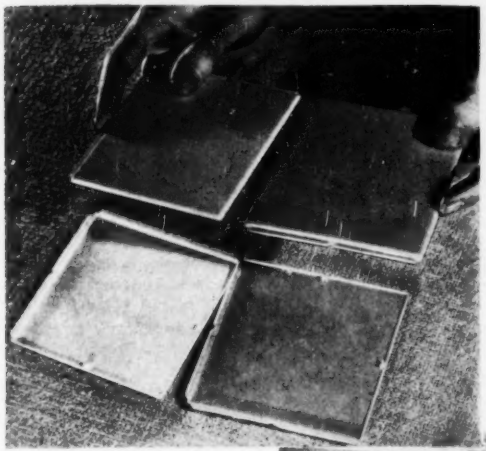
COURTESY HACHMEISTER INC.

in locations where the material will be subjected to continuous temperatures of more than 140° F. Breakage, however, has not proved to be a problem, since the individual tiles are resilient and will yield rather than crack under a normal blow. Freedom from warpage in the finished tile depends largely on correct molding technique to produce pieces free of internal strains.

One problem still under investigation stems from the incompatability of the polystyrene tile and vinyl sheeting used in bathroom shower and window curtains. In installations where the curtains are in direct contact with the tile, crazing frequently results. It is hoped that this reaction can be avoided through surface coatings such as Logoquant.

Proper merchandising by tile manufacturers and firms which install the tile has played an important part in opening up the market for this product. The C. F. Church Mfg. Co., Holyoke, Mass., in bringing out its line of polystyrene tile, is packing the product in colorful boxes containing a specified number of square feet of wall coverage, clearly labeled with the Church name. It is pointed out that this product and company identification at the point of actual installation pays dividends in additional sales, since many persons have an opportunity to see the container while the tile is being put up.

Church is producing the tile in a variety of sizes —4¼ by 4¼ in., 8½ by 8½ in., and 8½ by 12¾ in.—in addition to cap strips and feature strips, affording a wide choice of installation treatments. The sizes may be used individually or in combination when desired. (*Turn to next page*)

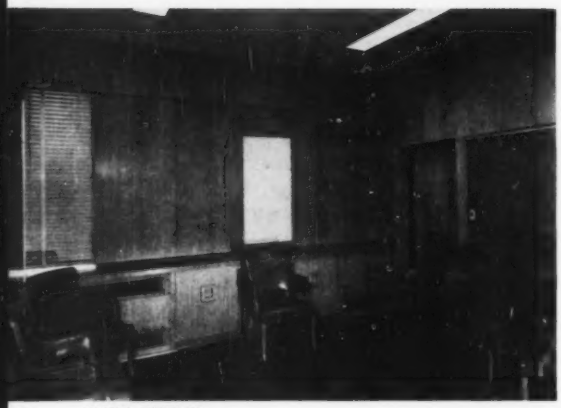


COURTESY PITTSBURGH TILE CO.

Installation of Pittsburgh tile is simplified by self-aligning tongue-and-groove lap joint with center notch which fits over a lug on under side of the adjoining tile

COURTESY MARSH WALL PRODUCTS, INC.

Barton Bros. Food Market, Hammond, Ind., has walls, partitions, fixtures, shelves, counters, covered with white Marlite panels. The panels are hardboard with a baked-on urea formaldehyde resin finish



COURTESY FORMICA CO.

Office wall is surfaced with 1/16 in. thick Formica Realwood sheet bonded to plywood core with Formica back sheet

Among other large producers of the tile are S & W Moulding Co., Columbus, Ohio; Hachmeister Inc., Pittsburgh, Pa., and Pittsburgh Tile Co., Pittsburgh. S & W, whose tile has gained wide distribution, has worked closely with tile installation firms. This company, like Church, has set up facilities where workmen representing its distributive accounts can study proper methods of installing the tile.

A feature of the Hachmeister line of Hako plastic wall tile is the inclusion of molded inside and outside corner tiles and cove base tiles, which contribute to a more attractive job and which simplify installation.

The Pittsburgh Tile Co.'s product features a self-aligning lap joint said to make installation simple even for the unskilled handyman. The design incorporates a tongue-and-groove lap joint on two sides of the tile with a center notch which fits a "dot" lock in the adjacent tile. The lock secures each tile as it is set in correct vertical or horizontal alignment, while the lap joint forms a complete plastic wall or ceiling surface and eliminates the need for grouting joints.

Wilson Plastics, Inc., Sandusky, Ohio, introduced its new LockBack tile last year. This tile is molded with four undercuts extending entirely across the back of each piece. When pressed into position on the wall, this tile, with its patented construction, is said to adhere permanently, since the ribs provide a mechanical lock between the mastic and the tile. According to the manufacturer, the ribs also provide added strength and rigidity, preventing the mastic from drawing the tile inward when it dries.

Nalle Plastics, Inc., Austin, Texas, is offering a tile made from metallic Lustrex in bronze.

Through a special polystyrene wall tile committee, the Society of the Plastics Industry has been working on the development of detailed specifications which will establish a minimum standard of quality for polystyrene wall tile and will also serve as a guide to producers, distributors, contractors, architects, installers, and users.

Through this activity, it is intended to inaugurate proceedings in conformity with the Bureau of Standards procedure for establishing voluntary industry standards. Among the details to be covered by the specification are surface appearance of the tile, uniformity of dimensions, trimming of gates, minimum thickness, conformance to manufacturer's color charts, installation procedure, cleaning, use of destaticizers, and other points.

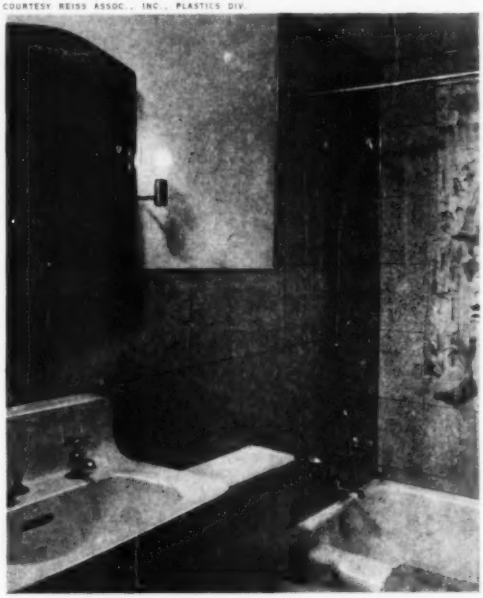
Some of the better known types of polystyrene tile now on the market range in cost from approximately 50¢ to 75¢ per sq. ft. for the material alone, with some of the larger sizes ranging to 85¢ per sq. ft. In the Chicago area, the per-square-foot cost of a complete polystyrene tile installation, including the tile, adhesive, labor, and incidentals is somewhere between $1.20 and $1.80. In the same area, structural glass runs from $3.50 to $5 per sq. ft. installed; ceramic glazed tile, $2.50 to $4; structural ceramic glazed tile, approximately $2, and aluminum and steel tile, $1.25 to $1.75.

Other plastic tiles

There are at least two other types of plastic tile now on the market. One of these is a high-pressure phenolic-melamine laminate; the other consists of

Mirror-Tile, a high pressure phenolic-melamine laminate, is used on bathroom wall. The tiles are 12 by 18 inches

COURTESY REISS ASSOC., INC., PLASTICS DIV.



a combination of vinyl resin with asbestos fibers and mineral coloring pigments.

Reiss Associates, Inc., Plastics Div., Boston, is the manufacturer of Mirror-Tile, which is a high-pressure phenolic-melamine product 1/32 in. thick. This material comes in tile sizes of 12 by 18 in., with special sizes available on order, and is recommended for bathrooms, showers, kitchens, halls, playrooms, hospitals, public rooms, etc. A high-gloss, mirror-reflecting surface is one of the features of Mirror-Tile. It weighs only 4 to 6 oz. per sq. ft.

Mirror-Tile is available in black and seven mother-of-pearl effects—grey blue, dark blue, pink, green, yellow, and dark red. It is applied to wall surfaces with a pressure-sensitive adhesive supplied by the manufacturer; the light weight eliminates any "hanging" problem. For accurate fitting, the tile can be scored with a sharp blade or cut with a fine saw. It can easily be bent to a large inside or outside radius.

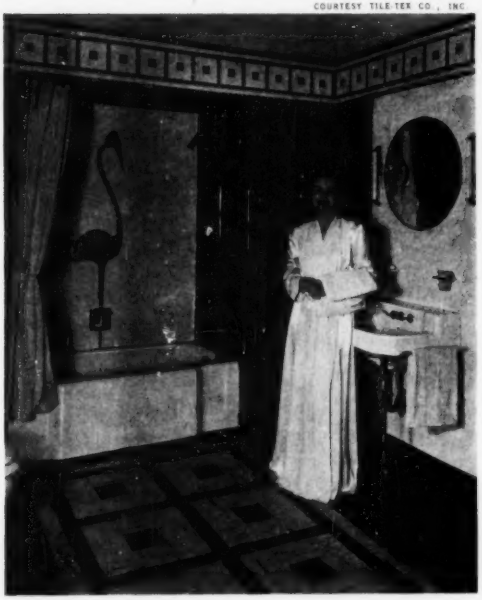
Mirror-Tile retails at approximately 60¢ per sq. ft. Generally, contractors make a flat price, including cement, of $1 to $1.25 per sq. ft., which covers all labor and materials, including the aluminum trim used at the top of the installation. Another phenolic-melamine tile is being manufactured by Leathertone, Inc., Boston.[1]

Mura-Tex plastic wall tile, a product of Tile-Tex Co., Inc., Chicago Heights, Ill., is described as a

[1] "High Pressure Laminate Wall Tile." MODERN PLASTICS, *26*, 77 (June 1949).

Mura-Tex wall tiles, made of asbestos fibers and resin binders, are color-keyed to Flexachrome plastic flooring

COURTESY TILE-TEX CO., INC.



COURTESY WESTERN PRODUCTS, INC.

Sink counter and part of kitchen wall are surfaced with Westplak polyester laminate held by mastic and molding

"plastic asbestos" product. It consists of asbestos fibers combined with special resin binders and non-fading mineral coloring pigments. The material is produced on calender rolls and die cut into tiles.

The tiles are 3/32 in. thick and are available in various sizes ranging from 6 by 6 in. to as large as 18 by 24 inches. In addition, there are units for striping in widths from ¼ to 3 in., as well as personalized custom-made inserts. Laid in a special waterproof adhesive, the tiles are applied directly to any smooth, solid wall surface.

The 25 colors in which Mura-Tex is offered include strong tones, pastels, and mottled effects and are keyed directly to the manufacturer's companion product, Flexachrome plastic floor tile. The Mura-Tex tiles are supplied with a satin-like matte finish that is easily cleaned with a damp cloth and any ordinary household cleaning powder. They are used not only in residential kitchens and bathrooms, but also in schools, hospitals, and other commercial structures as a low-cost, colorful wainscoting.

Wall and ceiling panels

Marlite plastic-finished wall panels, produced by Marsh Wall Products, Inc., Dover, Ohio, are of particular interest because they represent the use of a baked-on urea resin finish in combination with a base sheet of tempered Duolux hardboard, which is itself a semi-plastic product bonded together by the natural lignin of the wood fibers.

Marlite panels are available in two grades in various colors and patterns. They have a finished thickness of 5/32 in. and measure 4 ft. wide, ranging from 4 to 12 ft. in length. The panels are recommended for use in homes, stores, hotels, factories, institutions, service stations, etc., where service requirements are severe. The tough, baked-on finish

(*Please turn to page* 156)

Improving VINYL FILM *Products*

No. 3 of a series on vinyl film, sheet and coatings

How new equipment and techniques speed fabrication, give greater flexibility of operation, and extend the fields of application

EVERY day the fabricators of vinyl film are learning new ways, developing new ideas for cutting costs and improving their products. Thus, most of them are now adapting a relatively new technique which promises to supplant needle and thread sewing in many applications. This technique involves bonding or sealing of one piece of vinyl film to another and presents various advantages that sewing does not offer.

There are several types of successful bonding or sealing machines on the market, but the industry still needs more experience to take full advantage of their possibilities. The old complaint that variations in film made it difficult to seal has been largely overcome by improvements in the sealing machines; but surface variations such as printing ink, dyes, and the wax or oils sometimes used in calendering film create little problems that require experience in handling. Then too, almost every manufacturer's film seems to require a different temperature for sealing, and the difference in stretch is quite noticeable.

There are many plants now equipped with batteries of sealing machines, and some products, such as the better grade vinyl raincoats, are almost exclusively high frequency sealed. Enthusiasts for the bonding, or heat sealing, technique claim that bonders give more production than sewing machines. There is no thread to handle, no needle to puncture the film, no bobbin to wind. The finished item is inherently stronger and will frequently demand a premium price. Such products as mattress, pillow, and furniture covers, or any two layers of 4-mil material, can be fastened together on a heat sealer more satisfactorily, according to sealing machine producers. They even say that bonded curtains or drapes have a better appearance than the stitched variety.

One of the reasons for the claim that bonding is superior to sewing is the flexibility or stretch of vinyl film—it stretches so much more than ordinary thread that pulling on the film in the direction of a sewed seam will often snap the thread.

Sealing methods

Solvent sealing, heat sealing, and high frequency sealing are all in use by various fabricators; but high frequency sealing is far more prevalent in the industry. What a year or two more may bring forth in the development of improved methods for solvent or heat sealing is anybody's guess, but today fabricators seem more enthusiastic over the high frequency method. In ordinary heat sealing, where the heat is applied to the outside of the film, there is danger of over-heating the surface. In high frequency sealing, the film is heated internally by the electric field as the film is moved between two electrodes. The electrodes remain at normal tem-

High frequency continuous seamers have all-around utility. Attachments are available to fit machines for special jobs

COURTESY MAYFLOWER ELECTRONIC DEVICES, INC.

perature as the heated plastic material is compressed into a strong, attractive, air- and water-tight seam.

Bar sealing, either by conventional heating or high frequency, is common practice in the industry but has limitations because of its inflexibility; however, jigs have been built in all sorts of shapes to fit the pattern of the seam to be bonded. These jigs are virtually electrodes built into complicated forms. They are both expensive and difficult to construct. Nevertheless, such complicated pieces as inflatable beach mats with transverse ribbing have been bar sealed.

Custom die makers have gone into the business of making brass dies that can be attached to bar sealing machine electrodes with some interesting results. One of their comparatively recent creations is a die that can be used to stimulate stitching—that is, the sealed seam looks to the casual observer as though it were stitched. Helps appearance, say the developers. A fabricator producing scissor scabbards designed a heat sealing die of this type so that he can seal four units at a time. He then puts them on a clicker machine where a steel rule die cuts them apart along the sealed edges. Another method employed for smaller work is tear sealing. In this case, the electrode die has a sharp edge that cuts the material simultaneously with sealing.

One company has used 24 bar sealers for years to seal the crescent shaped top of a vinyl liner for dress shields. Another operator can seal from 18 to 24 gross a day, a rate of about ½ sec. each.

Most people do not feel that the bar sealer will ever be more than an auxiliary tool in vinyl fabricating plants. For straight work it will become indispensible to supplement sewing machine operations because of its speed, but the problem of bar sealing around corners, armholes, etc., is difficult to whip. For large jobs such as shower curtains, where sealing is done in comparatively straight lines, the item requires a machine and jigs so large that some critics question the investment value.

Continuous seaming

One of the methods recommended to help the equipment problem of the small or middle-sized fabricator, as well as the big volume producer, is the high frequency continuous seamer. Of course, the recommendation is made by the various manufacturers of these machines, but there seems to be merit in their suggestions. For one thing, the all-around utility of the continuous seamer makes it possible for the operator to do almost anything by bonding that can be done by stitching on a sewing machine. The machine itself is not expensive—$1750 in New York in comparison to anywhere from $700 to $2000 for a bar sealer and $250 for a sewing machine. There are a few operations, such as ruffling

An Industry Spreads Out

Indicative of the broad range and tremendous possibilities of the vinyl film industry is the following partial list of products that can be fabricated by heat sealing with high-frequency bonding equipment.

Adding machine covers	Milk bottle bags
Aprons, household	Mixer covers
Auto seat covers	Napkin containers
Baby bibs	Outdoor furn. covers
Baby pants	Oxygen tents
Basket liners	Panties
Bassinet covers	Pillow covers
Bathing suit bags	Pillow guards
Bedspread protectors	Pinafores
Bicycle covers	Platter covers
Blanket bags	Plate covers
Blouse covers	Powder puff bags
Bowl covers	Powder capes
Bread bags	Protective clothing
Broiler covers	Rain capes
Brief case covers	Rain coats
Brush & comb bags	Rain hats
Card table covers	Rainhoods
Carriage covers	Rain jackets
Children's aprons	Rain-scarfs
Clothes bags	Refrigerator bags
Coffee maker covers	Roaster covers
Crib sheets	Sewing machine covers
Cuff protectors	Seat covers
Curtains (window)	Shelving
Curtains (drapes)	Shelf edging
Diaper bags	Shoe bags
Dolley bags	Shirt bags
Envelopes for lingerie	Shoulder covers
Folders for clothing	Shower caps
Food bags	Shower drapes
Fruit bags	Sleeve protectors
Fruit squeezer covers	Slip covers
Furniture covers	Splatter mats
Garment bags	Storage bags
Golf jackets	Stuffed toys
Hanger covers	Sweater bags
Hanky folders	Table covers
Hat & cap protectors	Table cloth covers
Instrument covers	Tennis racket bags
Jewelry bags	Toaster covers
Kitchen curtains	Tobacco pouches
Lamp shades	Travel cases
Lamp shade covers	Typewriter covers
Laundry bags	Umbrella covers
Linen bags	Vanity table skirts
Luggage covers	Vanity top protectors
Make-up capes	Waffle iron covers
Mattress covers	Wall protectors
Meat bags	Washing machine covers

COURTESY GOODYEAR TIRE & RUBBER CO.

Operator is putting completely waterproof electronic seams in ladies' rainwear. Conveyor belt next to operator helps bring the work up to the machine. Conveyor is driven at same speed or slightly faster than bonding machine

and shirring, that have not yet been mastered by a continuous seamer, but developers say it is only a matter of time before attachments will be rigged up for even those complex operations.

The continuous seamer itself looks something like a sewing machine but is equipped with electrodes and rollers instead of a needle and is generally operated at a bonding temperature of between 270 and 340°. It is easy to operate and, by a simple adjustment of the speed control knob, feeding action is easily regulated to feed the work at from 3 to 50 ft. per minute. Some operators simply use larger drive pulleys to obtain greater speed.

The manufacturers of the machines also produce a number of attachments for binding, hemming, etc., that are quite similar to the attachments used on sewing machines. These attachments do all sorts of things: one will turn and bond both edges of strip film to form tie strings, belt and hanger loops, etc.; another will fold and bond two layers of strip; a third folds a binding strip over the edge of one or more plies of film; a fourth turns the edge in a double fold.

Still another of these attachments seams two edges at once with what amounts to a dual electrode. This is particularly useful in sealing the header on a shower curtain where it hems both edges and seals the header to the body of the curtain in one operation. And another folds the film over a cord, sealing the cord tightly into the material with an imitation stitch seal. It is used where additional strength is required, such as on the edge of a raincoat or wallet, or in furniture welting.

One of the first problems encountered in sealing with continuous seamers was to bond a multitude of layers without interruption. For example, the top grade vinyl raincoats have a 9-ply layer on the facing at the bottom hem where the reinforced strip down the front laps over the bottom hem. The sealing machines are now equipped either with variable speed arrangements or otherwise so that they can bond these multiple layers with almost no loss of speed.

Handling of large size pieces of film on either the sewing or heat sealing machine is simplified by a belt conveyor assembly. This may contain either 1, 6, or 12 belts ingeniously built over a tablelike structure that is attached to the side of the machine nearest the electrode. The conveyor belts are driven slightly faster or in unison with the speed of the bonding machine. They assist the operator in bringing the work up to the machine, provide smooth, easy passage of the materials between the electrodes, and aid in moving the completed work away from the machine as the sealing progresses. Quicker, neater sealing and a saving in production time and expense can be achieved since the conveyor leaves the operator's hands free to more effectively perform the actual bonding operation.

An additional aid to handling film and speeding up production is a grommeting sealer which inserts special vinyl grommets in shower curtain heads. It is essentially a two-roll operation in which the grommet is punched from 20-gage vinyl and sealed into a tape which later becomes the top, or head, of a shower curtain. It can also be used for sealing in buttonholes, particularly on raincoats. If desirable, the grommets can be embossed with the manufacturer's name at the same time they are welded into the film. This same embossing principle

can also be employed to place a company's label on a garment.

Film width increases

The business of handling larger pieces of vinyl film is becoming more complicated as producers show a tendency to increase the width of their film. The standard textile widths of 24, 36, 48, and 54 in. have also been standard in vinyl until a 72-in. material was introduced in 1948. Industry reaction has not been unanimous in favor of the wider material. Some producers claim it is difficult enough to control thickness variation on a 54-in. calendered roll without taking on the additional burden of a wider sheet. Besides, say the critics, there are very few applications except shower curtains where the wide measure is of advantage. Nevertheless, the manufacture of 72-in. material goes on apace, with the producers doing their own printing and apparently unconcerned about the fears of contemporaries.

A machinery manufacturer, picking on this difference of opinion about 72-in. film, says the way to take care of it is to electronically seal two 36-in. pieces together. Not only will his high frequency sealer put a seam down the middle to give a 72-in. piece of material, but it will simultaneously hem the two outside edges. The machine can be modified to produce 48 or 54 in. widths with a center seam and hemmed edges if desired, and any number of combination seals and hems can be handled. For example, all four sides of a garment bag could be sealed, and then the top and bottom, including zipper, could be heat sealed or sewn to the body. The machine runs at a speed between 45 and 60 ft. per min. and sells at around $15,000.

The problem of attaching zippers to vinyl goods has been attacked in two new ways. In one, the part of the tape to which the teeth are fixed is woven completely of cotton; the portion of the tape to which is sealed the vinyl film is woven with a predominance of thermoplastic vinyon yarn, a material made from an acrylonitrile and vinyl copolymer combination. Theoretically, at least, this zipper can be perfectly heat sealed to vinyl film. The second approach is a zipper made with a solid vinyl tape, now on the market and being considered for use in items as large as mattress covers.

Film inspection

A "must" for converters or printers and frequently used by fabricators is an inspection machine for examining rolls of film for defects after they have been calendered or printed, or, in the case of fabricators, before they start cutting up their goods. One manufacturer has built a machine of this type that combines rewinding, examining, and measuring in

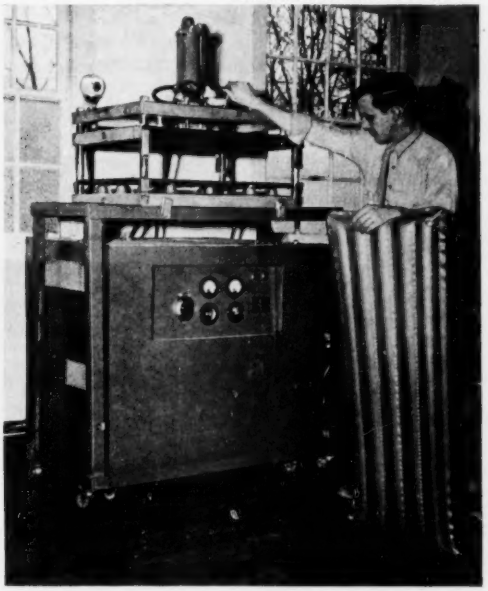
(*Please turn to page* 160)

Vinyl film is cut to pattern by electrically driven cutter. There are 400 plies of vinyl on the laying out table

COURTESY GOODYEAR TIRE & RUBBER CO.

High frequency bar sealer is used to bond the seams and the transverse ribbing in inflatable vinyl mattress

COURTESY MAYFLOWER ELECTRONIC DEVICES, INC.



PLASTICS PARTS

APPROXIMATELY 2 lb., 8 oz. of polystyrene and acrylic are used in the housing and valve parts of a new syrup dispenser molded for Canada Dry by Plastics Div., General Electric Co. Other plastic parts in the unit include a phenolic knob and a jug screw cap, plus two die cut gaskets, one made of nylon and one of polyethylene.

This unit is unique among fountain dispensers in that the valve was designed to provide a pre-measured 1-oz. "shot" or a continuous flow of syrup controled by a single push-button. After the delivery has been completed, the measuring chamber reloads automatically so that there is no delay when the next "shot" is called for.

The two-color housing, measuring 7¼ in. wide by 16 in. high, is just the right size to hold a standard gallon jug of syrup. It is molded in the correct shades of polystyrene to conform with Canada Dry's trade mark colors of green and white.

One complete dispenser contains 28 parts including 8 molded plastic parts, 6 stainless steel parts, and a die cast aluminum base. A padded clamp on the base holds it securely to fountain counters.

Acrylic compatible with syrup

According to laboratory tests, acrylic was found to be the better material for the four plastic valve parts which come directly in contact with the concentrated syrups. Polystyrene was chosen for the two large housing parts for reasons of cost, color range, and ease of fabrication. In the case of the dispenser knob, general purpose phenolic material was satisfactory but the threaded cap, because of the requirement for repeated assembly and disassembly with the mouths of syrup jugs, was necessarily molded of high impact phenolic.

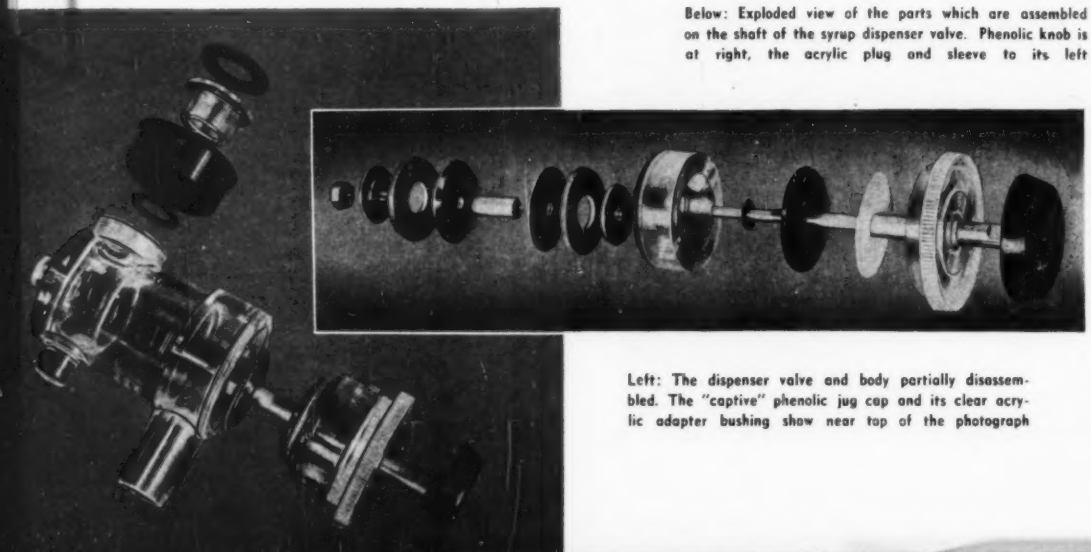
The largest shot used in making the parts of the dispenser is the top of the housing. Weighing approximately 22 oz. with sprues and runners, it is produced on a 28-oz. Watson-Stillman injection machine of white Lustrex polystyrene. Because of the thinness of the wall section and the required length of draw, knock-out pins were not feasible for removing this 10-in. high part from the force plug. The mold design was therefore centered around the stripper plate for ejection purposes. The part was center gated which necessitated a rather unusual gate removal and finishing operation.

The next largest part—the base of the housing—was molded on a 16-oz. H.P.M. machine, using green Lustrex polystyrene. This 14-oz. shot is gated with a semi-disk gate on the inside shoulder of the piece. A stripper plate was also used in this mold for ejection purposes.

After molding, the two parts are cemented together with a Styron adhesive. The advertising decoration on the housing is a decalcomania made with a special adhesive which will adhere to the polystyrene surface.

Threads molded in

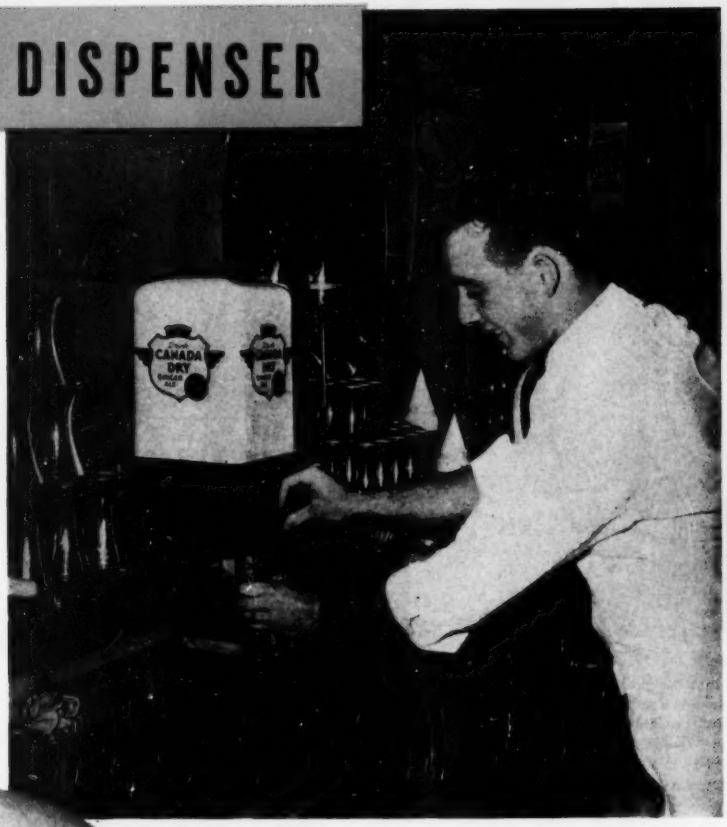
The intricate valve body is molded in a single cavity split mold with a direct sprue on a locating and support lug. A large internal thread for the end plug, an internal thread for the adapter bushing, and the external thread for the end cap are molded in. All additional holes are molded, except for a keyway which is machined by the press oper-



Below: Exploded view of the parts which are assembled on the shaft of the syrup dispenser valve. Phenolic knob is at right, the acrylic plug and sleeve to its left

Left: The dispenser valve and body partially disassembled. The "captive" phenolic jug cap and its clear acrylic adapter bushing show near top of the photograph

IN SYRUP DISPENSER



Polystyrene, phenolic, acrylic, nylon, and polyethylene are used in this syrup dispenser which also serves as an advertising display on the soda fountain. The unit is amply strong for fountain service

A metered 1-oz. "shot" of syrup automatically feeds into the center part of the valve body after a "shot" has been drawn off. A rear spring-loaded valve prevents syrup from flowing from the jug as long as the valve knob is firmly pressed in. However, if a continuous flow of syrup is desired, it will be obtained if the knob is pressed only part way in, so that both control valves are held open

ator. The weight of the complete shot, with sprues and runners, is 4 oz.; it is molded in a 12-oz. Watson-Stillman machine of clear methyl methacrylate.

The end plug, valve sleeve, and adapter bushing (all working parts of the valve) are molded in a combination mold on a Reed-Prentice 8-oz. machine. The adapter bushing which holds the jug cap is a shouldered tube with an external thread. This bushing screws into a mating thread in the inlet of the valve body. The phenolic jug cap has a large molded-in hole of such size that the outside diameter of the bushing can pass through it. Thus, when the assembly of the cap and bushing is completed, the cap is permanently held in place by the protruding shoulder of the bushing. These parts are also made of clear acrylic.

Judicious specification of these various plastic materials has resulted in the production of a colorful and utilitarian syrup dispenser which has sales appeal and, at the same time, meets the requirements of day-to-day fountain service.

Plastics Products

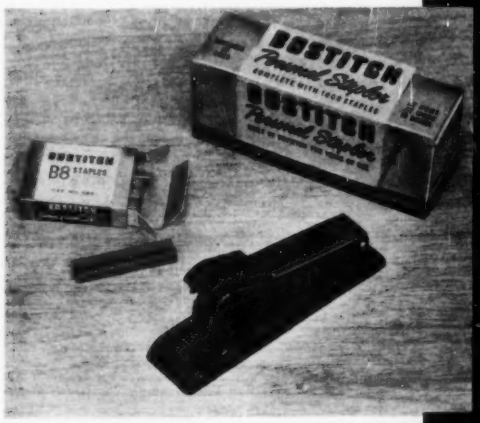
Coins for parking meters, bridge tolls, etc., are always quickly accessible in the Coin-Quick gear shift knob molded of cellulose acetate. The holder fits any standard gear shift lever and holds either pennies, nickels, dimes, or quarters. The knob is manufactured by Rosenberg Bros., 625 W. 55 St., New York

Chinese style rice bowls, soup bowls, soup spoons, and chopsticks are molded of Lustrex polystyrene. The dishes are light in weight and colorful. They are manufactured primarily for export to China, but are also sold in this country. Molded by Gem Plastics Co., 6014 W. Washington Blvd., Culver City, Calif.

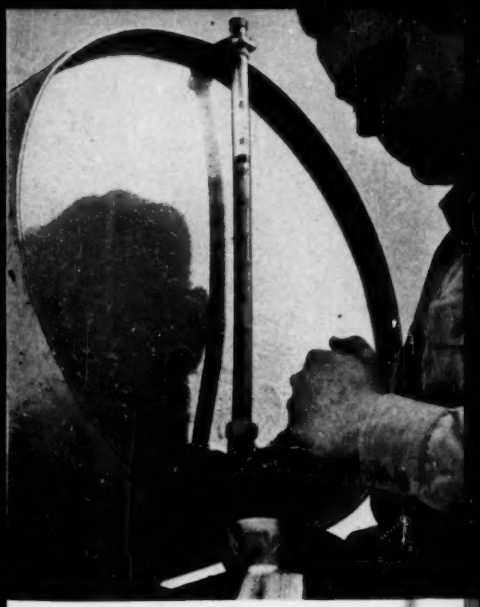
Cadet electric hair clipper has two-part housing molded of Beetle urea. Same housing, molded in a different color, is also used for the Whisker, an electric shaver built on hair clipper principles. Red phenolic switch button is used on both shaver and clipper. Housings are molded by Dickton & Masch Mfg. Co., 900 E. Vienna Ave., Milwaukee 12, Wis. Electro Tool Corp., 2405 Carlisle Ave., Racine, Wis., manufactures the clipper and shaver

Costly labels and time-consuming stencils are eliminated by the Algene roller printer, which can make as many as 160 impressions per minute. One quick movement inks the die and prints the copy. The shell and die holder of the device are molded of ethyl cellulose. Algene Marking Equipment, Inc., 18 W. 23 St., New York, manufactures the printer

Electric juicer has white Beetle urea housing which protects the working mechanism, adds to attractiveness of unit. The urea is unaffected by the citric acids, is easy to keep clean. The unit has an oscillating strainer which shakes down all available juice and thus reduces waste. Breyer Molding Co., 2536 W. Lake St., Chicago, molds the urea housing for Chicago Electric Mfg. Co., 6333 W. 65th St., Chicago 38



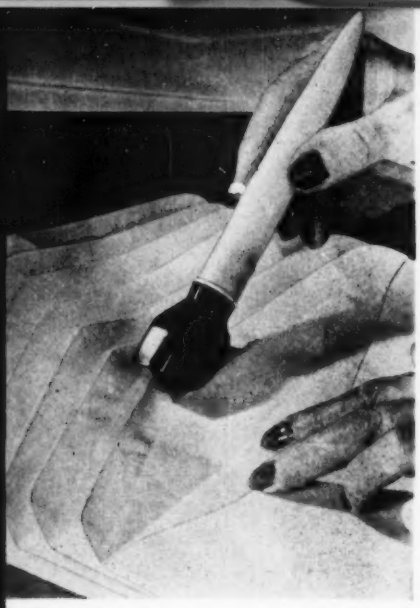
Completely redesigned stapler has base and press-knob molded of Resinox phenolic. The base, which must be strong enough to withstand repeated shocks, has a number of reinforcing ribs molded into the bottom. Phenolic parts are molded by Frank Teal Co., Box 3115, Westville Sta., New Haven, Conn. The stapler is made by Bostitch, Inc., 300 Mechanic St., Westerly, R. I.



Two lengths of transparent cellulose acetate butyrate tubing, one inside the other, form the liquid level indicator of the Tru-Oil Gage, designed for use on 55-gal. drums. Metal fitting keeps inner tube pressed on safety valve, allowing liquid to seek its level. If either tube breaks, pressure is released, thus stopping flow. Hopp Press, Inc., 460 W. 34 St., New York, extrudes the Tenite tubes for the Kingston Mfg. Co., North Plymouth, Mass.

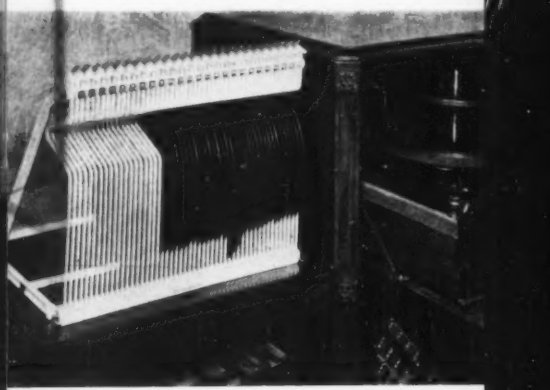
Instead of the single roller of the traditional rolling pin, all-polystyrene dough roller has eight parallel rollers, each ½ in. in diameter. The rollers are set in a circular frame 7 in. in diameter. Dough can be rolled more quickly, more easily, and only one hand is needed for the job. Roller is molded of colorful Bakelite polystyrene by Magnus Harmonica Corp., 439 Frelinghuysen Ave., Newark, N. J.

Soft, pliable Anitra Cushion Curlers, made of vinyl, simplify the task of setting hair after a home permanent. The whole job of putting up a head of hair can be done in a few minutes. Because of their flexibility, the curlers can be worn comfortably at night or covered easily during the day. Curlers are extruded of Geon vinyl by Resin Industries, P. O. Box 1589, Santa Barbara, Calif., for Anitra Products, Palm Springs



Capillary-Roll Sealer holds a supply of water for moistening envelopes, stamps, etc., feeds water to a rubber roller when the tube is squeezed lightly. The tube is molded of Du Pont polyethylene; the head containing the rubber roller is molded of Celcon ethyl cellulose. The joint between two parts is leak-proof. Manufactured by Northeastern Plastics Inc., 588 Commonwealth Ave., Boston, Mass.

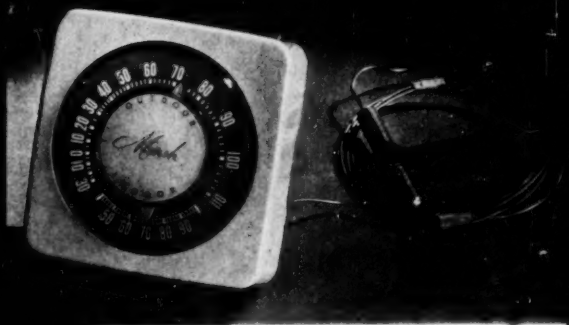
Door handle which does not have to be turned is molded of Tenite II cellulose acetate butyrate. Pressing the button set in the center of the handle releases the latch, allows door to be opened. The butyrate handles are colorful, easy to keep clean. Molded in 12 colors by Dulev Plastics Ltd., 35 Hanna Ave., Toronto, Canada, for Canadian Automatic Latch Co. Ltd., 103 Woodycrest Ave., Toronto



Fifty records can be stored neatly and compactly in the Recordmaster, molded of Lustrex polystyrene. The rack can be used on a table top or shelf, or placed inside a record cabinet. The units are made for 10 and 12-in. records in opaque ivory or transparent green. The racks are molded by Mutual Plastic Mold, 4719 Firestone Blvd., South Gate, Calif., for Development Corp. of America, 5755 Second Ave., Los Angeles

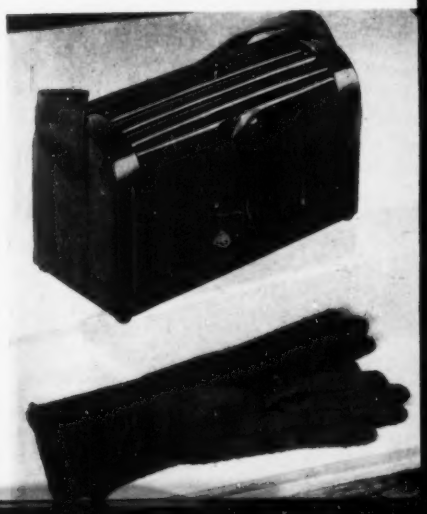
Plastics Products

Housing molded of Resinox phenolic improves the appearance and reduces the weight of new Electro-Sweep, an electric carpet sweeper which sells for about half as much as vacuum cleaners. Sweeper has no wheels; it glides on nylon brushes which are electrically driven to sweep at 3500 strokes per minute. Whole unit weighs only 9 lb.; it is made by Davis Mfg. Co., Plano, Ill.



Duo-Temp thermometer indicates outdoor temperature on top scale, indoor temperature on bottom scale of single dial. Outdoor reading is "piped" to dial from metal bulb outside house. Case and crystal, formerly made of stamped steel and glass respectively, are now molded of Koppers polystyrene by Chicago Die Mold Mfg. Co., 4001 W. Wrightwood Ave., Chicago, for Jas. P. Marsh Corp., Skokie, Ill.

Handbag has frame molded of Lumarith cellulose acetate and a lid like the top of a roll-top desk. Roll top slides in track molded in sides of frame and cannot jam. Loop on front of bag is slipped over knob on lid to keep bag closed. Frame and lid molded by Modern Plastics Mfg. Co., 118 W. 22 St., New York. Bag is made by Style-Art Handbags, 162 Madison Ave., New York



Cap'n Corky has a snout which serves as a bottle opener, a tail which serves as a corkscrew, and a back which is tough enough to be used as an ice crusher. The new bar accessory, available in five colors, is cast in one piece of a modified polyester resin by Ivorine Art Craft Inc., 424 E. 123 St., New York. It is packaged and sold by Howard L. Ross Associates, 17 E. 42 St., New York

YOU'LL GET A LAUGH OUT OF THIS . . . (we did)

Midland has been quite proud of its delivery schedule for the past few years and we have, of course, advertised it consistently on these pages for many months. We did get behind on an order from Patent Button Company, Knoxville, Tennessee, and their Mr. Snoddy prepared the advertisement below which is a perfect image of our "cat" advertisement with just a few changes. Our hat's off to Mr. Snoddy for some mighty good copy. P.S. They have their Hobbed Cavities now so we're all set to handle *your* requirements!

delivery?

AT MIDLAND IT'S FASTER THAN AN ELEPHANT CAN HAVE LITTLE ELEPHANTS!

This wall socket hobbed cavity by Midland incorporates two narrow "T" projections raised 3/16 inches above the cavity surface. By using hobbed cavities of this type in place of the conventional insert cavities, all unsightly parting lines were eliminated and in addition to improving appearance, the hobbing was accomplished at only a fraction of the cost of cavity duplication by machining methods.

Yes, actually! It takes an elephant two long years—but when Midland gives birth to a plastic mold—she seldom stays in labor for more than four or five months. Of course the whole period is longer than that but it is not often that eighteen months is exceeded between conception (of mold design) and delivery.

So if you have a gleaming idea for a molded product, just grab it by the tail and pitch it over to MD&E where delivery is gauged by elephantine standards.

For a clear picture of our equipment and our know how (but not when) write for a copy of "Shaping Tomorrow Some Other Time". Better still, send in your prints—at least two years before you need the tools.

MIDLAND DIE AND ENGRAVING COMPANY
1800 W. BERENICE AVENUE • • • CHICAGO 13, ILLINOIS
Makers of Plastic Molds • Die Cast Molds • Engraved Dies • Steel Stamps • Hobbings • Pantagraph Engraving

MD&E

Rounded-bow pram molded of fiber glass mat-polyester laminate is 8 ft. long and weighs 75 pounds. It holds as many as four adults and can be powered by an outboard up to 3.5 hp.

Mass Production Boat Molding

THE engineering battle between plastics and other materials frequently—almost invariably—becomes a clash between progressives and conservatives, between those who dare to pioneer and those who adhere closely to the familiar. A case in point is the field of small boats. Traditionally made of wood, small boats are now being produced by a simple, inexpensive molding method, using glass fiber mat impregnated with polyester resin.

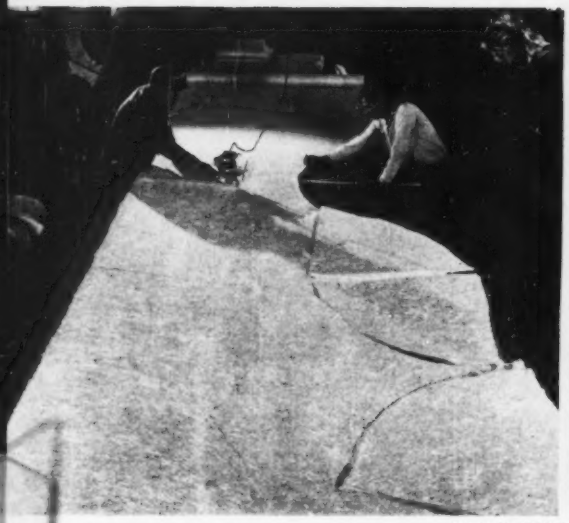
Illustrating the conservative attitude toward wooden boats is an article entitled, "The Question of Plastics," by Robert S. French, which appeared in the February 1945 issue of *Yachting* Magazine. The author, an expert on boat construction, made the following statements:

"We are eager to have things invented and we are often prone to assume that the new is necessarily an improvement. Not so long ago, a new group of materials appeared on the horizon—plastics. Now, at the risk of being considered conservative, I venture to suggest that the *perfect* plastic 'is not yet.' Wait awhile! Let the chemist stir a bit longer in his laboratory and he will have it— the absolute, ultimate material. But my post-war yacht will not have plastic rails or plastic cleats or plastic et cetera. She will be 'built of oak, teak, and mahogany, and will be bronze and copper fastened to last a lifetime'."

It might be considered a coincidence that at about the time this strong defense of wooden boat construction was published, a yachtsman and boat builder of many years standing, Carl Beetle, decided that good boats could be made of plastic. Mr. Beetle did not hold with the thoughts of Mr. French. Perhaps the "perfect" plastic had not been developed. However, Mr. Beetle knew that, no matter how good a piece of wood was, it would eventually rot. He knew that wooden boats had many seams, all of which required caulking. He knew that all

*Reg. U. S. Patent Office.

The success which has been achieved in simplifying boat hull molding of fiber glass mat-polyester resin laminate, as told in the accompanying article, points the way toward other broad applications. The well-known properties of the laminate, plus the now-revealed simplicity of production in inexpensive molds, make the possibilities almost unlimited. From liners for garbage buckets to one-piece phone booths; from motor-cycle side cars to wardrobe trunks; from shower stalls to dump cart bodies . . . the list could go on and on.



ALL PHOTOS COURTESY AMERICAN CYANAMID CORP.

Glass mat, unrolled on large work table, is cut to predetermined pattern. It is applied in layers to mold and sprayed with resin

The first layer of glass mat is applied to a deck mold. A parting agent and a layer of resin have already been sprayed on the mold

woods—in fact, any material produced by nature—had to be continuously protected against the ravages of the elements. He knew that synthetic materials were available which would literally last a lifetime without continual upkeep.

But it takes more than a stirring by a chemist to produce a good boat from these materials. Such a venture must be cooperative. It requires not only the skill of the chemist, but the knowledge of how to handle the materials and the skill of the practical boat builder as well.

At first the Beetle boats were produced from a Fiberglas mat-Laminac resin laminate by the traditional "low pressure" method using metal molds, rubber bags, and pressure. This method was abandoned, however, and the Beetle Boat Co., Inc., New Bedford, Mass., is currently producing 15 glass laminate boats per day, using simple, inexpensive plastic forms and an oven. These boats range in size from an 8-ft. pram to a 15-ft. outboard and are made from the same Fiberglas-Laminac combination as originally used. In the current process there are no rubber bags. There is no pressure. In fact, Beetle's "open air" process is so simple as to raise the familiar and often plaintive question: "Why wasn't it done before?"

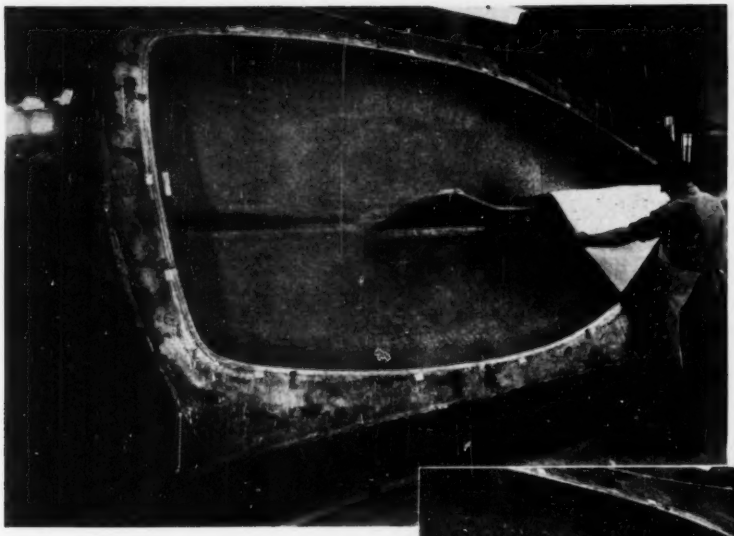
The simplicity of the present operations and of the required equipment are made all the more apparent when compared step by step with details presented in a United States Navy Bureau of Ships Report on the equipment and production methods used in molding a 28-ft. boat from a fiber glass mat-polyester resin laminate similar to that used in the Beetle boats.

The navy boat was made in two polished ½-in. thick female aluminum molds, one for the hull and one for the deck. The deck mold was fitted to the hull mold. Each mold contained a grid of steam pipes for heating. A rubber bag, tailored to fit between the two molds and to press against the inside surfaces of the female molds when inflated, was also part of the required molding equipment. In order to produce the heavy aluminum molds, a perfect wood master or male form was needed over which the plate aluminum could be hammered to shape.

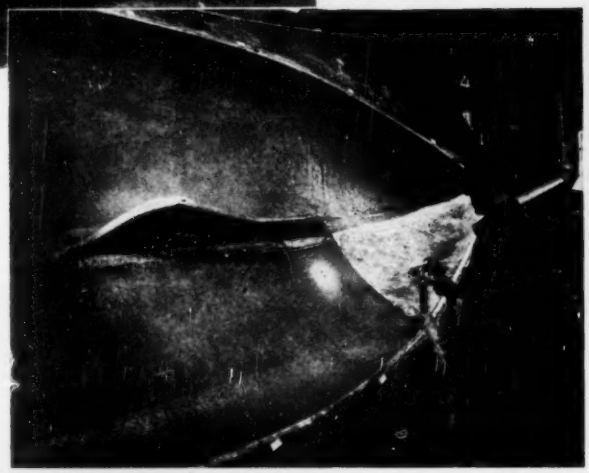
Simple, inexpensive molds

The Beetle system requires only a smooth male facsimile of the shape to be molded. This facsimile may be of any firm, workable material such as paper, plaster, cement, or wood. Instead of a hammered aluminum female mold, the Beetle permanent mold is made from a glass-resin laminate similar to that used in the boats themselves. The glass mat is laid up on the male facsimile and cured. Although the resulting plastic molds are permanent—that is, they can be used for producing an indefinite number of finished pieces—large production requires the use of several. As many more molds as are needed can be made on the same male facsimile.

These finished molds are mounted in plywood boxes with the tops open. The box for the hull mold has short lengths of shafting bolted to each end, which are supported about 4 ft. above the floor by



Mold for sail boat hull rotates on shafts, enabling operator to reach surfaces easily. Here, first section of glass mat is applied



Another portion of the hull surface is sprayed with resin prior to laying up another piece of glass mat. Slot is left to accommodate centerboard in finished boat

As soon as the deck and hull sections are sufficiently strong to handle, the deck lay-up is removed from its mold and placed in position on top of the hull. Additional resin and mat are applied at the joint

"A" frames. The shafts are free to turn in the "A" frames, thus permitting the entire mold assembly to be rotated on its long axis. This permits ease of lay-up and resin application. The removal of the laid-up boat is accomplished by turning the mold on its side and manually withdrawing the lay-up from the mold. The deck molds do not require this rotating feature because of the ease with which the operators can reach all sections of the mold surfaces.

Large air ducts connected to the plywood boxes serve to circulate air at a controlled temperature around the under surface of the mold. Inasmuch as these lay-ups cure without pressure, no rubber bags with their necessary parting agent are required.

The lay-up operations for the inflated bag method are about the same as the open air method up to a certain point. In both methods the parting agent and then a layer of resin are sprayed successively on the mold surface. The Navy pigments this outer layer of resin while Beetle adds a large percentage of mineral filler. Next, successive layers of glass mat, cut to predetermined pattern, are laid in position in the mold.

The pattern, the shape, and number of layers can be determined only by experience. This know-how is an important factor in attaining satisfactory strength factors. Each layer of glass mat is sprayed with the resin mixed with accelerator. At this point in the procedure the methods begin to differ. In the Navy operation, the inner mat surface—the one away from the mold—was covered with polyvinyl alcohol sheeting. The same surface in the Beetle operation remains exposed to the air at all times. The Navy next placed the rubber bladder in position after which the deck mold was inverted over the hull and the two clamped together.

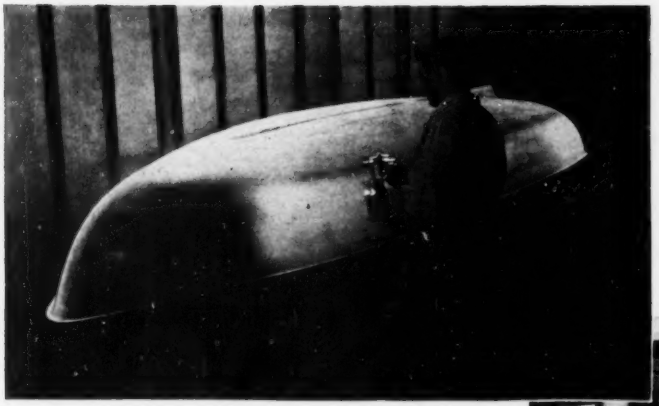
Single, homogeneous structure

In the Beetle operation, the deck and hull sections are separately allowed to reach a gel stage in which, although the resin is still "green", the two sections are sufficiently strong to handle. The deck lay-up is then removed manually from its mold and placed in position on top of the hull. Additional resin and mat are now applied at the joint so that when final curing has been completed, the two parts will have become a single homogeneous structure. Shortly after the deck and hull have been assembled, the complete boat is removed from the mold to a carriage and rolled into a large oven where the final curing is completed.

The Navy operation, by contrast, required inflation of the bladder after the lay-up was completed. This forced the mat against the mold surfaces. The deck mold was fitted with an air lock through which

After removal from hull molds, assembled boats are rolled into a large oven for final curing. Here two different types await final finishing

Sanding rough spots and parting lines gives boat a uniform finish



To meet consumer demand for different colored boats, lacquer is sprayed on. This has been found more practical than coloring resin

Floatation material, keel, and oarlock sockets are "molded in". After attachment of seats, chocks, and cleats, boat is ready for water

workers could enter the inside of the bladder while it was under pressure. Electric lights and a telephone system were installed inside the bladder. The inside work consisted of tamping the bladder snug around frames in order to equalize the pressure on the laminate. After the pressure had been brought up to 30 p.s.i., steam was circulated through the grid of heater pipes. This caused the temperature of the laminate to reach 177° F. in an hour, after which curing continued at this temperature for two hours. Air and steam were then turned off, the mold separated, and the completed boat removed from the hull mold.

Boats made by either method require some sanding at the parting lines, but the amount of labor is negligible. All Navy boats are battleship grey so there is no problem of pigmenting the resin, once the desired color has been achieved. For civilian boats, however, personal tastes dictate that many different colors and combinations must be available. Hence it has been found more practical to spray-lacquer the Beetle boats rather than to try to produce many different colored batches of resin. Standard automobile lacquers are used to produce a serviceable finish.

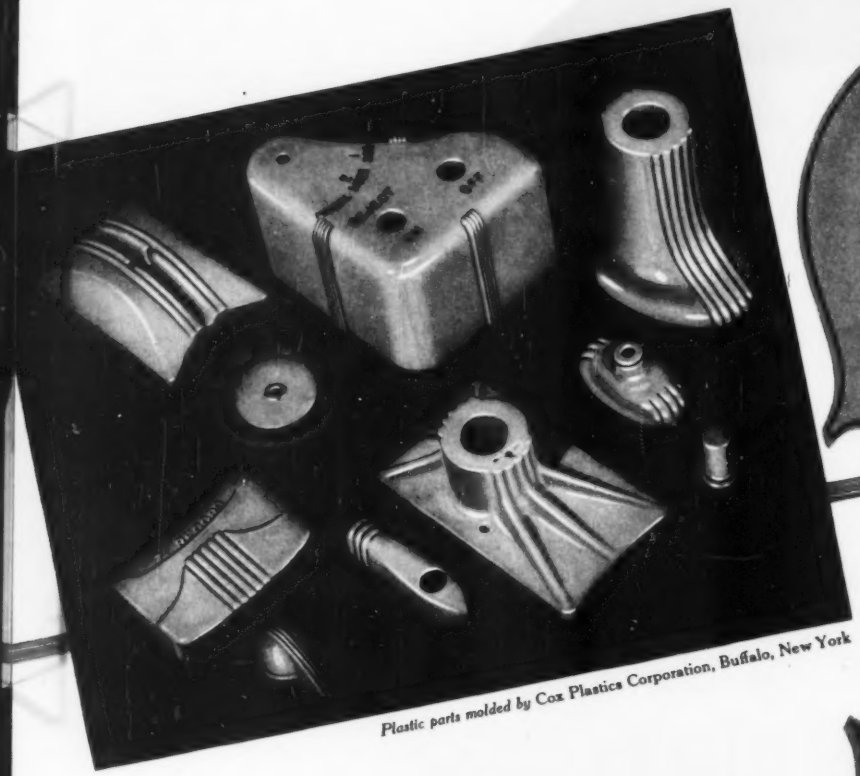
The Navy "molded in" the keel, engine girders, and transverse and bulkhead frames, while Beetle "molds in" floatation material and keel and oarlock sockets. The floatation material consists of blocks of Foamglas which are embedded in the thwarts. Seats, chocks, and cleats are assembled after molding.

Large production teaches economy

This step-by-step comparison of the present Beetle and reported Navy methods for producing the same class of product is not intended to detract one iota from the workmanlike job which the Navy accomplished. As a matter of fact, as already indicated, the original process for making Beetle boats was very similar to that used by the Navy. It is quite reasonable to assume that if the Navy had had Beetle's experimental opportunity in the production of thousands of boats, they would now be using a much more economical production procedure.

The comparison does prove, however, that when a small scale development program is pitted against the opportunity presented by large scale production for product and methods improvement, the latter will win out. This is made even more apparent by the latest Beetle model, a rounded-bow pram which retails at $89, yet is only 10 in. shorter than a 9-ft. Beetle dinghy, which sells for more than twice as much.

Lovely to look at



Plastic parts molded by Cox Plastics Corporation, Buffalo, New York

PLASKON

TRADE MARK REGISTERED

★ **MOLDED COLOR** ★

PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS COMPANY • 2121 Sylvan Ave., Toledo 6, Ohio • *In Canada:* Canadian Industries, Ltd., Montreal, P. Q.

Branch Offices: Boston, Chicago, Los Angeles, New York, Rochester, San Francisco • *Manufacturers of Molding Compounds, Resin Glues, Coating Resins*

Delightful to hear

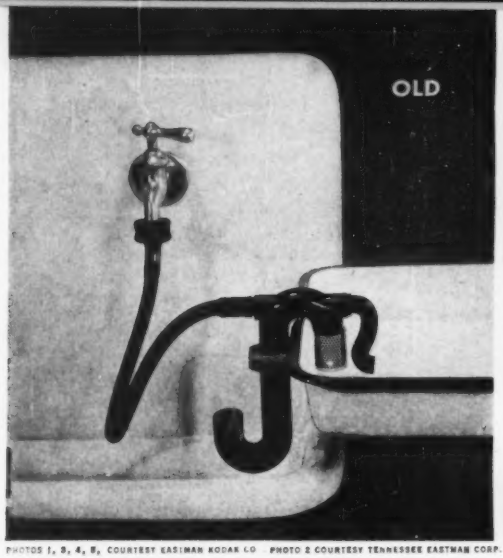
Markel Electric Products' new Playmaster provides music lovers with nine continuous hours of delightful listening pleasure. The soft, beige color of the 24 Molded Plaskon parts used in this record player harmonize beautifully with practically every wood finish or room decoration.

Plaskon Molded Colors are being used by hundreds of manufacturers to enhance the beauty of their products. Plaskon Urea and Melamine formaldehyde *Thermosetting* Materials range from white and translucent natural, through brilliant hues and delicate pastels to jet black.
Colors are permanent—unfading in use—because they are an integral part of the molded piece.

There are many additional sales advantages that Plaskon Molded Color can add to your product. Among them are: Rigid plastic that won't soften under heat—High dimensional stability—High dielectric strength—High tensile and compressive strength—Hard non-porous surface that is non-tarnishing and non-corrosive—Resistance to weak acids, soaps and solvents. An experienced Plaskon field man will be glad to help you and your molder adapt Plaskon* Molded Color to your products for greater economy and efficiency in your manufacturing and merchandising operations.

*Reg. U. S. Pat. Off.

The Playmaster plays all three sizes and speeds of records automatically—one or both sides in sequence. *Manufactured by* Markel Electric Products, Inc., Buffalo, N.Y.



PHOTOS 1, 3, 4, 5, COURTESY EASTMAN KODAK CO. PHOTO 2 COURTESY TENNESSEE EASTMAN CORP.

1—First production model of tray siphon had three hard rubber parts, one metal part. It was expensive to make

2—New model, made of two cellulose acetate butyrate parts, uses same basic operating principles as old model

Redesigned for Plastic Molding

Siphon for photographers now produced in butyrate at reduced cost and with increased sales appeal

by A. B. Fox* and Gerard V. Delaire†

THE Kodak Automatic Tray Siphon has recently been redesigned in plastic to reduce costs and increase its sales appeal. The tray siphon is a convenient and efficient device for washing films, plates, and prints in the ordinary processing tray. It operates from any standard water faucet, automatically maintains the desired level in the tray, and discharges the washing water directly into the sink.

The tray siphon went through an evolution from the inventor's original idea, through samples and tests, into the first production model shown in Fig. 1. This model was very successful but lacked a great deal in appearance value and was fairly costly for the job it had to do. The new model, (Fig. 2), in which two molded cellulose acetate butyrate parts replace three molded hard rubber parts and one metal part, operates on the same basic principal as the previous model. The inner workings of this siphon are shown in the unassembled view in Fig. 3.

The fresh water flows from the rubber hose, through the nozzle (1) and passes as a solid stream through the orifice (2). From there, it passes down the supply channel (3) and out into the tray. As soon as there is sufficient water in the tray to cover the siphon intake ports (4), and the outlet (6) is filled above the trap, it is possible to establish the siphon. Between the intake ports and the outlet there now exists a trapped column of air (5). As the water continues to flow through the nozzle and across the gap between the nozzle and the orifice, this air is swept out into the supply channel and finally outside of the siphon.

When enough air has been removed for the level of the water to cover the high point in the siphon, the siphon begins to function. Eventually, almost all of the air is scavenged from the siphon, and it exhausts water from the tray much more rapidly than water can be introduced through the nozzle. The level in the tray is thus reduced below the intake ports fairly quickly and the siphon again fills with air. Again, the incoming stream sweeps the air from the siphon, and the process is repeated.

*Engineering Dept., Camera Works, Eastman Kodak Co.
†Plastics Laboratory, Camera Works, Eastman Kodak Co.

3—Molded tongue in one half of siphon mates with groove in the other half. One half is mirror image of the other

4—Cement is applied by hand from a pressure tank with a hypodermic needle. Cement is applied to grooved part only

The siphon is symmetrical about a plane through the siphon tube and the supply channel and is therefore molded in two parts, with one part a mirror image of the other. The parts are molded of Tenite II by Erie Resistor Corp., Erie, Pa.

Tenite II was chosen for the job because it can be molded economically, will withstand soaking in water and acid hypo solutions, has high impact strength, and has a good appearance. In addition, the two butyrate parts can be sealed together by cementing, thus eliminating the need for fastening members or gaskets. The tongue and groove design of the two parts affords a channel in one part into which a formulated cement can be placed. This cement is made up of 300 parts of ethyl lactate and 20 parts of the Tenite used to mold the parts.

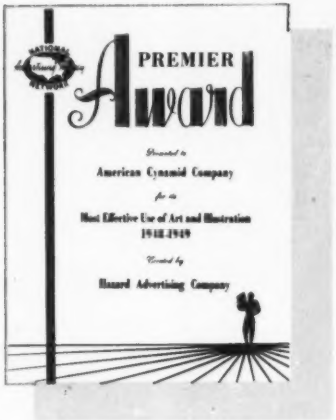
Cement applied under pressure

The cement or sealer is applied by hand from a pressure tank (Fig. 4) with a small orifice hypodermic needle under approximately 30 lb. air pressure. This affords a constant and uniform flow of cement which the operator can control. The rate of flow can be varied with the air pressure applied to the cement supply in the pressure tank.

The operator applies the cement to the groove, then places the second part of the assembly so that the molded tongue section lines up with the cement-filled groove. It is not necessary to apply cement to the tongue in a separate operation because the tongue becomes coated on contact with the groove.

The assembled siphon is then placed in a cam type press (Fig. 5) so that uniform and positive pressure can be applied to all parts of the assembly for 10 minutes. The press is a wooden structure with a $\frac{1}{8}$-in. thick covering of sponge rubber on the "platens" where they make contact with the siphon. The pressure is such that positive contact is made without warping or deforming the molded parts. The 10-min. drying cycle is long enough for the cement to set and produce a water-tight unit.

5—After cement is applied, operator puts two parts together and puts siphon in cam type press for 10 minutes



National Industrial Advertisers Association
Award of Merit
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Class A - Product Advertising
American Cyanamid Company
for the CAMPAIGN which in the opinion of the Judges is of
Outstanding Excellence in its planning and execution.
Twenty-seventh Annual Conference
June 12 to 15, 1949, Buffalo, N. Y.

Cyanamid plastics advertising wins prizes for winning business for you!

The Cyanamid advertisements for BEETLE® and MELMAC® plastics reproduced here were designed to increase business for molders and sales for plastic product manufacturers.

Official recognition of their soundness and effectiveness in achieving these ends, has recently been given in two separate instances.

First, the campaign was awarded a Certificate of Merit by the National Industrial Advertising Association at its 1949 Panel Exhibit, in which 443 leading industrial advertising campaigns were judged.

Second, the campaign was given the Premier Award for most effective use of art and illustration in National Advertising Agency Network Creative Campaign Awards, in which 27 leading advertising agencies participated.

Naturally, we like to win awards. But we certainly realize that these are not ours alone.

The highly successful applications of BEETLE and MELMAC . . . which are the keystone of this campaign's effectiveness . . . could not have been demonstrated without the creative work of you molders, designers, engineers and merchandisers.

Thanks for your cooperation . . . and count on us regularly for any additional help we can give you.

American Cyanamid Company

*Reg. U. S. Pat. Off.

Minimize your headaches from short circuits
HEMAC® Plastics for Electrical Components
your product
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PLASTICS DEPARTMENT
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Exotic plastic makes beautiful handles
AMERICAN Cyanamid COMPANY
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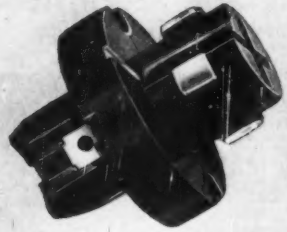

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* Terminal connector shown, molded for Harvey Hubbell Company of Bridgeport, Connecticut . . . by Plastic Molding Corporation, Sandy Hook, Connecticut. Its "Trojan-like" strength was achieved thru the use of Resinox 3941 (compounded with Claremont Flock), a plastic formulation by Monsanto Chemical Co., Springfield, Massachusetts.

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Autographic Method for Measuring Stiffness of Nonrigid Plastics

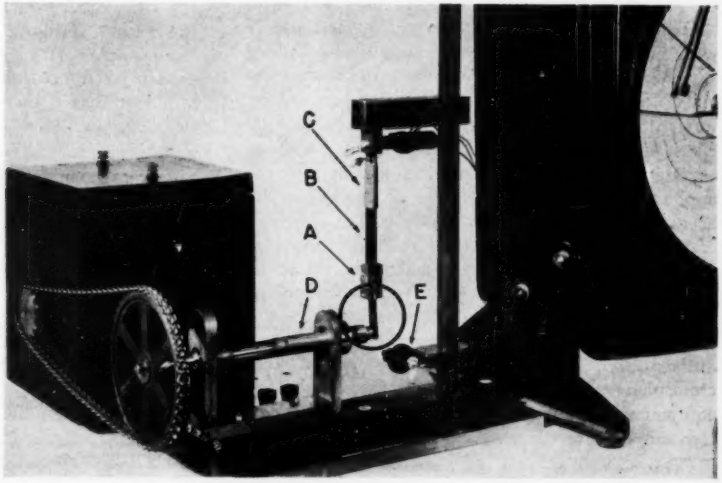
by R. D. DeWAARD*

SINCE the flexibility or lack of stiffness of nonrigid substances dictates their field of applications, it follows that a reliable and convenient method for quantitative evaluation of this property is necessary in the development of new materials, as well as for control of production of existing resins. Moreover, since plasticizers are usually compounded with intrinsically rigid resins to accomplish a particular flexibility, testing is required to assess the effectiveness of such processing. Temperature dependence of flexibility is another property of elastomers which must be known if their range of usefulness is to be predicted. The purpose of this paper is to report a technique which has been found to be both accurate and convenient for measuring the stiffness of nonrigid plastics over an extended range of temperature.

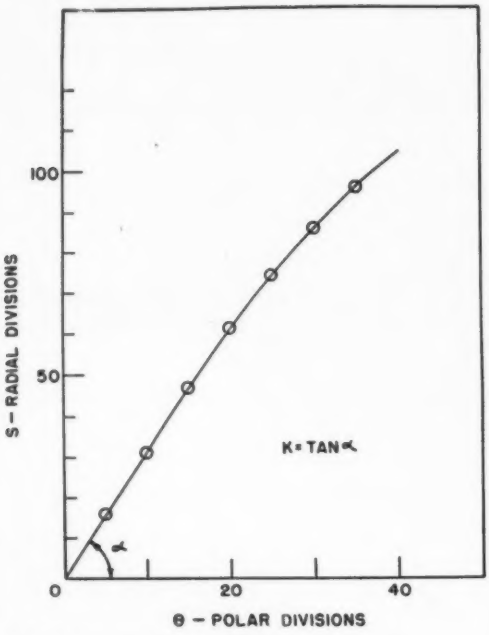
Several methods have been described in the literature which provide reliable evaluation of the stiffness of elastomers. Liska[1] employed central loading of a simply supported beam with weights, and obtained data over a temperature range from 0 to —60° C. Although this method performed adequately at low temperatures, as it was intended, the extreme flexibility of nonrigid resins at higher temperatures makes gravity loading inaccurate, chiefly because of excessive plastic flow. Clash and Berg[2,3] devised equipment for torsion loading of a specimen, the use

*Physicist, Analytical and Testing Div., Stamford Research Laboratories, American Cyanamid Co., Stamford, Conn.

[1] "Effects of Low Temperatures on Young's Modulus of Elastomers", by J. W. Liska, Ind. Eng. Chem. 36, 40 (1944).
[2] "Vinyl Elastomers, Low-Temperature Flexibility Behavior", by R. F. Clash and R. M. Berg, Ind. Eng. Chem. 34, 1218 (1942).
[3] "Stiffness and Brittleness of Non-rigid Vinyl Chloride Acetate Resin Compounds", MODERN PLASTICS 21, 119 (1944).



1—Completely assembled stiffness apparatus. Test specimen is circled



2—Graph from recorder shown replotted on rectilinear coordinates. Initial slope (K) enters in stiffness computation

of which enabled them to calculate "apparent modulus of rigidity." This apparatus operated satisfactorily at temperatures above as well as below room conditions, since torsion spring elements of appropriate stiffness were chosen depending upon the stiffness of the sample being tested. Probably the most widely used method[4] at present is one which has been tentatively adopted by the American Society for Testing Materials. This procedure provides for measuring the angle of bend of a cantilever specimen as a function of the applied bending moment. As is the case with the torsion method, no limitations imposed by extreme flexibility at high temperatures restrict the use of this instrument. The suitability of this and the torsion method are illustrated by data reported by Clash and Berg[3] in which they show gratifying correlation between the two techniques as they are applied to determine the stiffness of vinyl chloride-acetate compounds from +60 to —70° C.

Although existing methods, such as those described above, offer sufficient accuracy and precision for most purposes, they are sometimes lacking in convenience. For example, in cases where it is desirable to perform stiffness determinations at conditions other than those provided by normal room atmospheres, it is often necessary to house the test equipment in inaccessible areas, such as an oven or a low-temperature chamber. This introduces difficulties in operation, and in obtaining coincident load and deflection readings as registered on the several scales of the apparatus. Simultaneous load-deformation data are necessary to establish the slope of the initial portion of the stress-strain curve. In the torsion method mentioned above, this difficulty is avoided by immersing the specimens in a liquid bath, leaving readily visible the scale which registers angular twist for a given applied moment. Temperature control by means of a liquid medium, however, introduces problems of attack of the sample.

Some of the difficulties attending evaluation of the stiffness of elastomers have been eliminated with the aid of the apparatus to be described here. Use is made of electric resistance-wire strain gages[5] attached to suitable weighing beams to measure and record the force exerted on a cantilever specimen. A constant rate of straining is maintained in the sample throughout a test by means of a motor-driven loading screw. Autographic load-time recording, with the use of a commercial recorder, permits precise reproduction of the load-deflection curve. Conventionally, stiffness is then computed from the slope of the initial portion of this curve and the dimensions of the sample. Since the recorder plots all necessary data, and control and operation of the equipment are handled remotely by electrical switching, the method is particularly well suited for testing in confined spaces, where materials are being examined for effects of temperature.

Description of apparatus

The apparatus is shown in Fig. 1. The cantilever sample (circled), in normal position for testing, is clamped by means of a small set screw vise (A) to the end of a calibrated metal weighing beam (B). Cemented at the fixed end of the weighing beam are two strain gages (C), one on each face. The gages are electrically connected to a Baldwin Southwark SR-4 strain recorder, shown at the extreme right in the figure. A motor (housed in box) drives the loading screw (D) by means of a chain-and-sprocket coupling. The end of the screw which contacts the specimen has a ball-shaped[6] tip to minimize frictional forces. Shown at the base of the upright support is a small pulley arrangement (E) which provides a means for calibrating the weighing beam with standard weights. The various parts enumerated above, with the exception of the recorder, are attached as a unit to a rigid plastic base, about 1 ft. sq. The over-all height of this assembly is also approximately 1 foot.

Theory and procedure

A mechanical analysis of the testing equipment will be developed to show how the stiffness of a specimen is computed from the curve drawn on the

[4] A.S.T.M. Standards, Part III-B. 1946. Philadelphia: American Society for Testing Materials.

[5] The apparatus described is under experimental license from the Baldwin Locomotive Works.

[6] Errors due to indentation of the loading screw into the specimen were found to be negligible.

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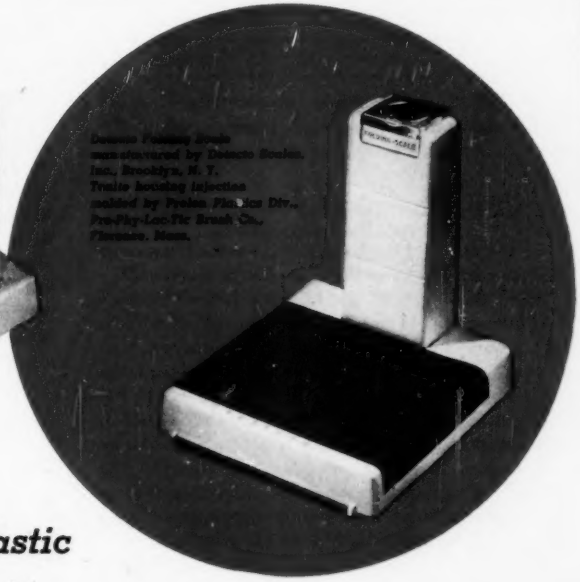

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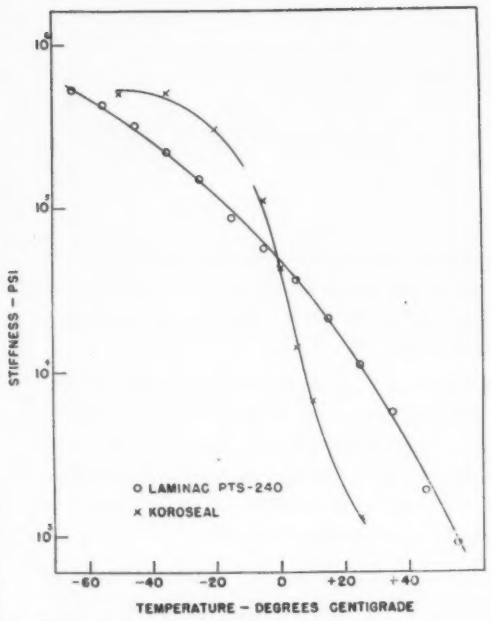

3—Characteristic stiffness-temperature behavior of two nonrigid plastics

strain recorder chart and the size and shape of the sample.

It has been shown, according to classical theory of elasticity, that the following relationship exists when an elastic beam is loaded as a cantilever:

$$E = \frac{48L^3}{I} \times \frac{P}{\delta} \qquad (1)$$

where E is Young's modulus of elasticity, P is the load at the end of the beam, L is the length of the beam, I is the area moment of inertia of the beam ($\frac{wd^3}{12}$ for a prismatic beam, where w is the width and d the depth of the beam), and δ is the transverse deflection of the end of the beam due to the load P.

When dealing with an inelastic beam, Young's modulus can be replaced by a term called stiffness (E′) if only small deformations are considered, such as those associated with the initial portion of the stress-strain diagram. The principal difference between modulus and stiffness is that the former is a constant of elastic solids only slightly dependent on temperature and rate of straining, whereas the latter is a property of inelastic materials that is critically dependent upon both temperature and rate of straining. Dimensionally they are identical.

In equation (1), since L and I are constants for a given sample, only the ratio of the load P to the deflection needs to be interpreted from the plot on the recorder. Because of the elastic character of the weighing beam, the recorder reading (S) is proportional to the load (P) applied to a test specimen fastened to the weighing beam. Therefore:

$$P = M_1 S \qquad (2)$$

The constant M_1 is determined by placing a stiff (duralumin) beam in the sample vise and loading the beam, with the aid of a small pulley, at a distance L from the sample vise. Because the weighing beam is elastic, recorder readings are also proportional to the deflection (δ_1) of the end of this same stiff beam (the duralumin is not bent measurably by the small forces involved). The following equation expresses this linearity:

$$\delta_1 = M_2 S \qquad (3)$$

The constant M_2 can be evaluated by turning the screw known distances and reading corresponding recorder deflections. M_1 and M_2 are seen to be constants for a particular weighing beam and need be determined only once.

The stiff member, used to calibrate the weighing beam, is now replaced with a flexible plastic specimen and, by starting the motor, a record is obtained on the recorder chart. Figure 2 shows such a record after replotting on rectilinear coordinates. This plot exhibits the characteristic nonlinear behavior of a non-Hookeian material. Assuming linearity near the origin, however, an approximate relationship can be expressed as follows:

$$S = K\,\theta \qquad (4)$$

K is the slope of the first part of this curve and can be computed from the plot.

When a specimen is bent by the action of the loading screw, the deflection of its end is due to bending of the weighing beam as well as bending of the specimen. Of the total deflection taking place, that due to bending of the specimen is alone of value and must be determined. This is accomplished as follows: At any time (t) the total deflection of the end of the sample with respect to the fixed end of the weighing beam can be expressed in terms of the speed (V) of the loading screw by $\delta_2 = V\,t$. Since the strain recorder chart makes one revolution in one minute, and the chart has 96 polar divisions, $\theta/96$ will be the time in minutes for a polar deflection of a θ div-

(*Please turn to page* 164)

Table I.—Constants for Weighing Beams

Weighing beam	M_1	M_2
	10^{-4} lb./div.	10^{-4} in./div.
A	0.252	5.17
B	0.344	8.20
C	1.460	8.05
D	4.760	5.61
E	19.100	2.87

Saccharification Lignin Concentrates in Phenolics*

by T. F. CLARK†

A corncob lignin concentrate is obtained as a by-product of a continuous saccharification process developed as a part of the Federal Synthetic Liquid Fuels research program. A number of investigations have been under way to find practical uses for this concentrate. One of these investigations was a study of the use of the by-product in phenolic plastics both as a component in resin condensations and as a filler in thermosetting compounds. In both cases the final molded products, although of very good appearance, were relatively brittle and weak in strength properties; flexural strength values were of the order of 7000 p.s.i. compared with 9000 p.s.i. the minimum required for Type II general purpose phenolics. Outstanding of the properties of the molded compounds was the high resistance to water absorption, a characteristic which might merit consideration of the lignin concentrate in compounds for which improved water resistance is desired. This corncob lignin is comparable in behavior to that of saccharification lignins obtained from wood.

TWO saccharification processes for producing sugars from cellulosic materials have been under active investigation in this country during the past few years. One is the modified Scholler process, developed by Harris and his co-workers at the U. S. Forest Products Laboratory, for the use of wood waste as raw material.[1] It was operated for some months commercially in a plant specially built for its use at Eugene, Ore.[2] The other process, developed by Dunning and Lathrop of the Northern Regional Research Laboratory, is being used for the continuous saccharification of agricultural residues.[3] It is now under semi-works investigation at Peoria, Ill., as a part of the Federal Synthetic Liquid Fuels Investigation program.[4,5] While these processes vary considerably in detail and end products, they are designed primarily to produce low-cost sugars which in turn may be converted to fuels, solvents, feeds, and other products.

In both processes and, indeed, in all processes for saccharifying lignocellulose, lignin or lignin concentrate is produced as a by-product for which little practical use except that of fuel has yet been found. If a rational use for the lignin concentrate could be established and it could be sold, say at $20 per ton, the economics of these processes would be greatly improved. The industrial success of these saccharification processes is, therefore, primarily a problem of economics.

One of the possible uses for the lignin from such processes is as a component in plastics. Unpublished reports concerning uses made by the Germans of the lignin they produced in operating the Scholler process indicated that this lignin was of little value in plastics. Similar findings have been reported for the lignin obtained from the modified Scholler

(*Please turn to page* 168)

Table I.—Composition (Dry Basis) of a Saccharification Lignin Concentrate Recovered from Red Corncobs

Component	*Amount*
	%
Lignin (by 72% H_2SO_4 method) including cutin	47.5
Ash	1.06
Methoxyl ($-OCH_3$)[a]	7.3
Cutin[b]	0.4
Reducing sugars in the hydrolyzate from the lignin determination (calculated as glucose)	43.7
Cellulose:	
Monoethanolamine method (pentosan free)[c]	40.1
Cross and Bevan method (pentosan and ash free)	41.8
Alpha cellulose	19.3
Alcohol-benzene extractives	14.4
Pentosans	3.4
Titratable acidity (as SO_3)	0.22
Alkali solubility:	
1% NaOH solution	71.5
7.14% NaOH solution[d]	80.9
Nitrogen (Kjeldahl)	0.3
Moisture	4.1
pH (1 gram suspended in 50 ml. distilled water)	3.7

[a] "Semi-Micro Quantitative Organic Analysis," by E. P. Clark, Academic Press, New York (1943), p. 68.
[b] Unpublished data. Northern Regional Research Laboratory, Peoria, Illinois.
[c] "Determination of Cellulose in Fibrous Agricultural Wastes. A Rapid Method Using Monoethanolamine," by J. D. Reid, G. H. Nelson, and S. I. Aronovsky, Ind. Eng. Chem., Anal. Ed. *12*, 265 (1940).
[d] "Methods Used at the Forest Products Laboratory for the Chemical Analysis of Pulps and Pulpwoods," by M. W. Bray, U. S. Department of Agriculture, Madison, Wisconsin. Revised September 1939, p. 6.

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* From a thesis presented to the graduate faculty of Bradley University in partial fulfillment of the requirements for the degree of Master of Science. Work described in this article was carried on at the Northern Regional Research Laboratory, one of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

† Chemical engineer, Plastics and Building Materials Section, Agricultural Residues Div., Northern Regional Research Laboratory.

[1] "Madison Wood Sugar Process," by E. E. Harris and E. Beglinger, Ind. Eng. Chem. *38*, 890 (1946).
[2] "Wood Hydrolysis Alcohol Plant Ready to Run," by J. R. Callahan, Chem. Eng. *53*, 172 (Oct. 1946).
[3] "The Saccharification of Agricultural Residues. A Continuous Process," by J. W. Dunning and E. C. Lathrop, Ind. Eng. Chem. *37*, 24 (1945).
[4] "New Synthetic Liquid Fuel Plant in Operation," U. S. Department of Agriculture Press Release 2347-46 (Oct. 31, 1946).
[5] "Federal Scientists Make Motor Fuel from Farm Wastes," Northwestern Miller *2.6*, No. 2, Section 2, 22a (Apr. 9, 1946).

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed

Materials

UREA AND MELAMINE RESINS PRESS TOWARD NEW GOALS. J. R. Dudley. Chemical Industries *64*, 224-30, 320 (Feb. 1949). The history, properties, and applications of urea and melamine resins are reviewed; 78 references.

ALLYL STARCH—A NEW MATERIAL. M. H. Baker. Modern Packaging *22*, 131-3 (May 1949). The solubilities, compatibilities, and other properties of allyl starch and its solutions are reported. This new polymer is used in the formulation of inks and coatings.

POLYMERIZATION OF VINYLIDENE FLUORIDE AND 1,1-DICHLORO-2,2-DIFLUOROETHYLENE. E. T. McBee, H. M. Hill, and G. B. Bachman. Ind. Eng. Chem. *41*, 70-2 (Jan. 1949). The preparation and polymerization of vinylidene fluoride and the polymerization and copolymerization of 1,1-dichloro-2,2-difluoroethylene are discussed. Some physical characteristics of these polymers are given.

Coatings

CELLULOSE ACETATE BUTYRATE STRIP COATING COMPOSITIONS. C. J. Malm, H. B. Nelson, and G. D. Hiatt. Ind. Eng. Chem. *41*, 1065-9 (May 1949). Hot-melt strippable coatings based on a high butyryl cellulose acetate butyrate are described. These coatings are used to protect articles from corrosion, dirt, and abrasion. The cellulose ester, plasticizers, oils, waxes, and resins are used to make the compositions.

CELLULOSE ESTER SOLUTIONS. C. R. Fordyce and D. R. Simonsen. Ind. Eng. Chem. *41*, 104-11 (Jan. 1949). Solutions of cellulose derivatives in mixtures of organic solvents are employed for a variety of technical applications. An understanding of the mechanism of evaporation of such solvent mixtures is important to proper control of properties of surface coatings. Measurements during evaporation of several binary solvent mixtures were made and correlated with vapor pressures. Solvent mixtures in absence of cellulose derivatives were found to evaporate primarily according to liquid-vapor equilibrium characteristics during exposure to ordinary atmospheric conditions. In the presence of cellulose esters evaporation in many cases deviates from this behavior, showing selective retention of certain types of solvents.

Applications

WRINKLE RESISTANCE OF FABRICS. I. J. Gruntfest and D. D. Gagliardi. Ind. Eng. Chem. *41*, 760-4 (Apr. 1949). The results of experiments show that the wrinkle resistance of a fabric is determined by the extent of its multifilament character and by the ability of the separate fibers of which it is composed to recover from tensile deformations. The extent of multifilament character depends on the ratio of fiber diameter to fabric thickness. This ratio determines the minimum strain with which a fold may be made. The extent to which the minimum strain is realized depends on the ease with which the separate fibers can move relative to one another. This is, in turn, regulated by the structure of the fabric, the presence of sizing or lubricating agents, the smoothness of the fiber surface, and the stiffness of the fibers. Selected urea-formaldehyde resins, formaldehyde alone, and glyoxal, which have access to the inside of the fiber, improve the ability of cellulose fibers to recover from deformations and increase their stiffness. Resin deposited on the outside of the fibers impairs the multifilament character, stiffens the fabric, and reduces the ability to recover from folding.

Plasticizers

USE OF PLASTICIZERS. W. A. Woodcock. Ind. Eng. Chem. *41*, 663-5 (Apr. 1949). The growth of the plasticizer industry particularly as it relates to vinyl resin plasticizers is traced. Early practices with crude methods of selection and performance are cited. The experience gained through failures in use lifted the technical sights of the industry and demonstrated the need for higher performance standards. Recognition of the basic and secondary properties desired in plasticizers for vinyl resins became more acute. The results of this awareness were the stimulation of research to produce new, superior plasticizers and the rather rapid evolution of standardized test methods for the measurement of some of the more basic properties. Today the plasticizer industry can look back at many notable achievements in the last five years and forward to a bright future. The products of research, now becoming available to industry, give promise of quality improvements far beyond the expectations of early workers. With these new tools the vinyl resin industry can develop more satisfactory products for present uses and expand into untouched markets in the future.

CELLULOSE ACETATE BUTYRATE PLASTICS. W. M. Gearhart and W. D. Kennedy. Ind. Eng. Chem. *41*, 695-701 (Apr. 1949). The viscosity of cellulose acetate butyrate as a function of the nature and amount of plasticizer, and of temperature, was measured by means of a parallel plate plastometer. These data were used to assess numerical values for plasticizer efficiency, applying to the range of temperatures associated with molding, extruding, etc. The efficiency so found was discovered to be somewhat different at some temperatures from that determined by plasticizer solvent power, and at other temperatures, similar to it. The connection between the measurements of principal viscosity and molding conditions appears to be well established. The consequences of too low a molding temperature are clearly shown in terms of sharply increasing viscosity and onset of viscoelastic processes which may be responsible for permanent strains in molded pieces. A four-element mechanical model consisting of springs and viscous dashpots appears to fit these high-temperature phenomena quite well. All constants of this system are decreased as either temperature or plasticizer content increases.

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U.S. PLASTICS PATENTS

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POLYMERIZATION. C. F. Fisk (to U. S. Rubber). U. S. 2,466,800, Apr. 12. Oil phase polymerizing a liquid polyenic polyester in the presence of a peroxy catalyst and a sulfhydryl gelation promoter.

POLYAMIDES. T. Koch (to American Enka). U. S. 2,466,854, Apr. 12. Heating an omega-amino normal saturated aliphatic carboxylic acid amide until evolution of ammonia ceases; and further heating at higher temperature and lower pressure to produce a spinnable composition.

RESIN. L. M. Geiger (to Neville). U. S. 2,466,889, Apr. 12. Reacting crude solvent naphtha with a phenol in the presence of activated clay.

EXTRUDING. C. E. Dellenbarger. U. S. 2,466,934, Apr. 12. An extruding machine for plastic material.

LAMINATE. A. W. Prance and F. Lyijynen (to Briggs Manufacturing). U. S. 2,466,966, Apr. 12. A laminated article prepared by resin-bonding sheets, superimposing thereon an ornamental sheet coated with resin, and finally consolidating the entire assembly with heat and pressure.

COPOLYMER. T. H. Rogers, Jr. and R. D. Vickers (to Wingfoot). U. S. 2,466,998, Apr. 12. A thermoset copolymer of vinyl chloride and vinylidene chloride prepared by incorporating therein hexamethylene ammonium hexamethylene dithiocarbamate and subjecting to heat.

ROTOR BLADE. R. W. Hess (to Curtiss-Wright). U. S. 2,467,031, Apr. 12. A composite laminated aircraft rotor blade.

POLYALLYL ALCOHOL. D. E. Adelson and H. F. Gray, Jr. (to Shell). U. S. 2,467,105, Apr. 12. Polymeric alcohol prepared by saponifying a carboxylic acid ester of a polymeric beta, gamma-monoolefinic monohydric alcohol to the corresponding alcohol.

MOLDING. J. Bailey (to Plax). U. S. 2,467,107, Apr. 12. Means for removing molded slugs from molds.

CATALYST. M. J. Scott (to Monsanto). U. S. 2,467,160, Apr. 12. An acid curing aminoplast and a hydroxy amine salt as curing catalyst.

POLYMERIZATION. L. M. Richards (to Du Pont). U. S. 2,467,231, Apr. 12. A polymerization process comprising heating ethylenically unsaturated compounds in the presence of an iodo diacylate catalyst.

WOOL TREATMENT. J. B. Rust (to Montclair Research). U. S. 2,467,233, Apr. 12. Bath for shrinkproofing wool comprising an aqueous stable emulsion of a synthetic butadiene-1,3 polymer, a urea- or melamine-formaldehyde resin, a non-cationic emulsifying agent, and an alkali metal salt.

OLEFIN POLYMERS. D. E. Sargent and W. E. Hanford (to Du Pont). U. S. 2,467,234, Apr. 12. Olefin polymers prepared by heating ethylene with a mixture of *tert*-butyl alcohol and sodio-N-chloro-*p*-toluenesulfonamide under pressure.

POLYMERIZATION. G. M. Whitman and S. L. Scott (to Du Pont). U. S. 2,467,245, Apr. 12. Solid polymers of ethylene prepared by subjecting ethylene to heat and pressure in the presence of ammonia and a metal of group II of the periodic table.

CATALYSTS. H. A. Walter (to Monsanto). U. S. 2,467,280, Apr. 12. A molding composition comprising an acid-curing thermosetting resin such as an aminotriazine-aldehyde resin and as latent curing catalyst a di(aryl sulfonyl) peroxide.

POLYMERS. E. F. Izard (to Du Pont). U. S. 2,467,430, Apr. 19. Interpolymer of allylidene diethoxide and vinyl acetate.

MOLDING. V. E. Meharg, A. P. Mazzucchelli, and R. E. Nicolson (to Bakelite). U. S. 2,467,440, Apr. 19. Apparatus for heat molding plastic material.

ADHESIVE. D. V. Redfern (to American Marietta). U. S. 2,467,498, Apr. 19. Reacting cresylic acid, furfural, and sulfur at an elevated temperature in the presence of an alkaline catalyst, adding insoluble blood, mixing the mass and cooling.

ION EXCHANGE RESINS. J. R. Dudley (to American Cyanamid). U. S. 2,467,523, Apr. 19. A resinous product prepared by reacting a polyalkylene polyamine containing a primary amino group and a substituted 1,3,5-triazine containing at least two amine reactive groups.

COPOLYMERS. R. R. Harris (to American Cyanamid). U. S. 2,467,526-7, Apr. 19. Copolymerizing a homogeneous mixture including a polymerizable liquid containing a vinyl group, and an unsaturated alkyd resin obtained by esterifying a polyhydric alcohol with an unsaturated polycarboxylic acid.

COATING. C. C. Wilson and P. S. Britton (to Samuel Moore and Co.). U. S. 2,467,642, Apr. 19. Tubing, rods, etc., are coated with wear-resistant plastic by extrusion.

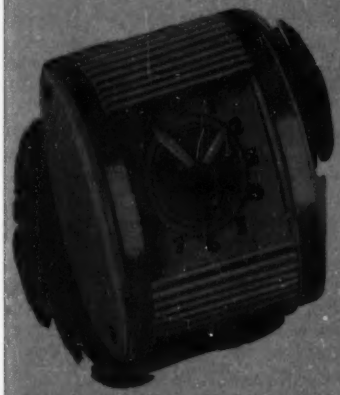
VINYL POLYMERS. L. Plambeck, Jr. (to Du Pont). U. S. 2,467,774, Apr. 19. A hydrolyzed interpolymer of vinyl acetate and ethylene prepared by treating an aqueous dispersion with a methanol-water soluble solution of sodium hydroxide.

POLYSILOXANES. R. L. Poskitt and G. S. Irby, Jr. (to G. E.). U. S. 2,467,853, Apr. 19. Heating a mixture of a liquid poly-dimethylsiloxane-monomethyl siloxane copolymer, a catalyst, and finally adding an inorganic pigment.

CATALYST. M. J. Scott (to Monsanto). U. S. 2,467,915, Apr. 19. Catalyst for acid-curing resins comprising o-xenyl phosphoryl diamide.

RESIN. H. S. Bloch (to Universal Oil). U. S. 2,467,958, Apr. 19. Reacting an aliphatic dibasic acid anhydride and a polyolefinic cyclic hydrocarbon fraction.

EMULSION POLYMERIZATION. E. C. Britton and W. J. LeFebre (to Dow). U. S. 2,468,027, Apr. 26. Copolymerizing a vinyl aromatic compound and a conjugated diolefin in aqueous emulsion at temperatures between



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50 and 150° C. at pH 1.5 to 3.0 in the presence of an iron salt.

COPOLYMERS. T. A. Ford (to Du Pont). U. S. 2,468,054, Apr. 26. Polymers of vinylidene fluoride and ethylene or halogen-substituted ethylene formed in the presence of a peroxy catalyst.

CASTING COMPOSITIONS. B. M. Marks. (to Du Pont). U. S. 2,468,094, Apr. 26. Casting by placing in a mold granular polymethylmethacrylate and a mixture of methyl methacrylate monomer and monomeric dimethacrylate esters of a mixture of glycols and polymerizing between room temperature and 140° F.

POLYMERIZATION CATALYSTS. J. A. Robertson (to Du Pont). U. S. 2,468,111, Apr. 26. Ethylenically unsaturated organic compounds are polymerized in the presence of a salt of azodisulfonic acid salts.

POLYVINYL ALCOHOL. C. A. Porter (to Resistoflex). U. S. 2,468,345, Apr. 26. Polyvinyl alcohol plasticized with ethanol formamide and a polyhydric alcohol.

RESIN. F. J. Soday (to United Gas). U. S. 2,468,413, Apr. 26. A composition of p-phenylphenol-formaldehyde resin, a hydrocarbon resin resulting from sulfuric acid treatment of a hydrocarbon oil, and tung oil.

RESIN. F. J. Soday (to United Gas). U. S. 2,468,414, Apr. 26. A composition of butadiene, styrene copolymer, and a hydrocarbon resin.

ION EXCHANGE RESINS. J. T. Thurston (to American Cyanamid). U. S. 2,468,471, Apr. 26. Ion exchange resin prepared by reacting a mixture of an aldehyde and a sulfonated ketone.

POLYAMIDE RESIN. D. W. Young and W. J. Sparks (to Standard Oil Development). U. S. 2,468,534, Apr. 26. A tough, flexible composition comprising a synthetic polyamide resin compounded with a copolymer of a mono-olefin containing a cyclic nucleus and an alkene of 3 to 8 carbon atoms.

PELLICLES. R. Bluma (to Societe Anonyme). U. S. 2,468,585, Apr. 26. Process for making flexible pellicles from a thermoplastic tube.

LAMINATING. T. de Forest. U. S. 2,468,656, Apr. 26. Laminating layers of material with a thermo-sensitive adhesive by means of hydrostatic pressure and the heat of molten metal which expands on cooling.

COPOLYMERS. W. E. Handord and J. R. Roland, Jr. (to Du Pont). U. S. 2,468,664, Apr. 26. Polymerization product of a mixture of tetrafluoroethylene and another ethyllenic compound.

PLASTIC SHEETS. F. E. Wiley (to Plax). U. S. 2,468,697, Apr. 26. Method of deep-drawing organic plastic sheets.

ISOCYANATES. E. L. Kropa and A. S. Nyquist (to American Cyanamid). U. S. 2,468,713, Apr. 26. A polymerizable mass including an isocyanate compound.

TEXTILE TREATMENT. A. S. Nyquist and E. L. Kropa (to American Cyanamid). U. S. 2,468,716, Apr. 26. Hydrogen donor textile materials are treated with a polymerizable mass containing an isocyanate.

EMBOSSING. G. W. Borkland. U. S. 2,468,731, May 3. Method for preparing ornamented embossed articles from thermoplastic sheet by preparing the design, photographing, preparing an embossing plate, and embossing.

INTERPOLYMERS. G. A. Griess and A. S. Teot (to Dow). U. S. 2,468,747-8, May 3. A clear varnish resin prepared by interpolymerizing a drying oil, a polymerizable monoalkenyl-aromatic hydrocarbon, and divinyl benzene.

COPOLYMERS. R. C. Morris and J. L. Van Winkle (to Shell Development). U. S. 2,468,769, May 3. Reacting unsaturated dicarboxylic acids with a low molecular weight unsaturated cyclic polymer of a branched chain hexadiene.

INTERPOLYMERS. E. D. Morris and G. A. Griess (to Dow). U. S. 2,468,770, May 3. Interpolymer of rosin and a polymerizable nuclear monovinyl aromatic compound.

INTERPOLYMERS. A. E. Young and H. M. Hoogsteen (to Dow). U. S. 2,468,798, May 3. Interpolymerizing linseed oil with a mixture of alkenyl aromatic hydrocarbons containing styrene and divinyl benzene.

HYDROCARBON RESINS. W. K. Griesinger (to Atlantic Refining). U. S. 2,468,822, May 3. A thermoplastic resin produced from an unsaturated hydrocarbon distillate by reacting with sulfuric acid.

ORGANOSILICON COMPOUNDS. W. H. Daudt (to Corning Glass). U. S. 2,468,869, May 3. Composition comprising a liquid polymeric organosiloxane.

RESIN. F. J. Held, Jr. and R. B. Blaine (to B. F. Goodrich). U. S. 2,468,975, May 3. Composition of polyvinyl chloride and a 4,4′-bis-alkyl-carbonate (diphenyl alkane).

COATING. K. W. Fries (to Rhinelander Paper). U. S. 2,469,108, May 3. Coating comprising an organic solvent solution of polymerized beta-pinene and a plasticized ethylenediamine polyamide of dimerized and trimerized linoleic and linolenic acids.

MOLDING. I. P. Rodman, Jr. (to Celluplastic). U. S. 2,469,130, May 3. Method for forming hollow articles of thermoplastic material.

ORGANOSILICON COMPOUNDS. R. H. Bunnell and D. B. Hatcher (to L-O-F). U. S. 2,469,154, May 3. Method of producing vinylphenyltrihalosilanes.

UREA RESIN. D. E. Cordier (to L-O-F). U. S. 2,469,-157, May 3. A dry thermosetting composition of a urea-formaldehyde resin and a potentially acid monoester of benzyl sulfonic acid with an alcohol such as borneol, menthol, and the like.

RESIN. D. E. Adelson and H. F. Gray, Jr. (to Shell). U. S. 2,469,288, May 3. A homopolymer of a di-allyl acetal of a saturated aliphatic aldehyde.

RESIN. R. L. Meier and W. E. Elwell (to California Research). U. S. 2,469,295, May 3. Copolymer of vinyl pyridine and an alkyl vinyl ketone.

INTERPOLYMERS. P. D. Caesar and A. N. Sachanen (to Socony-Vacuum). U. S. 2,469,326, May 3. Contacting a thiophene derivative with butadiene-1,3 in the presence of sulfuric acid to produce a resin.

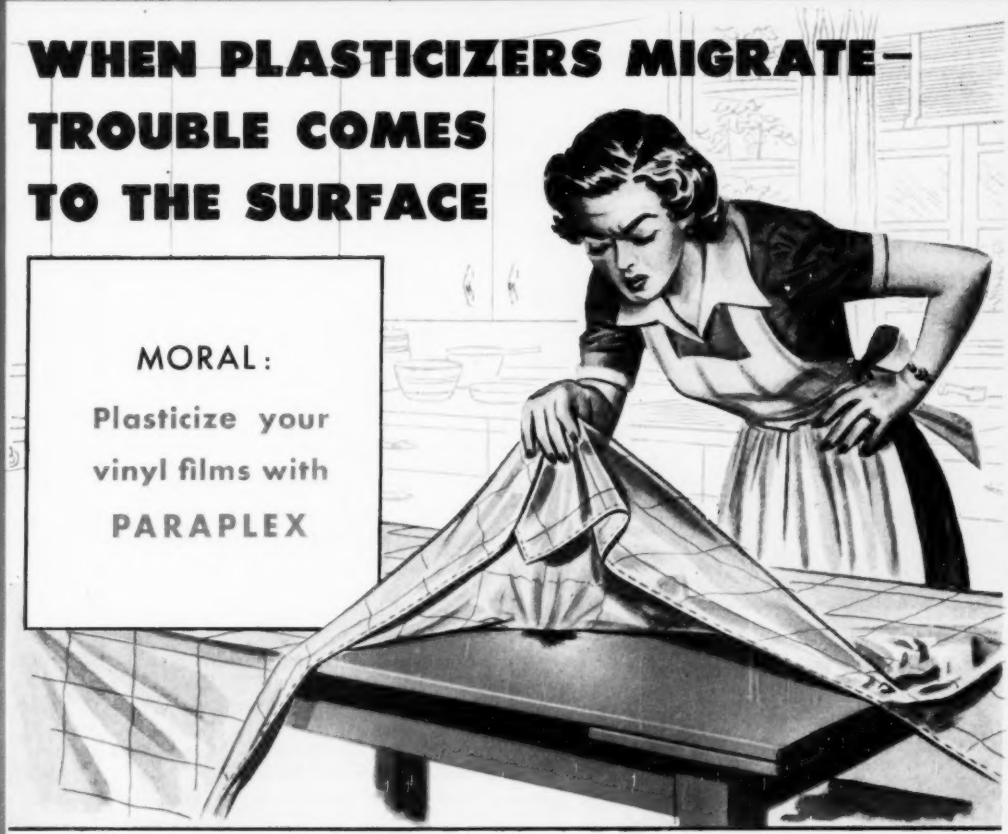
MOLDING. H. M. Richardson (to Grotelite Co., Inc., and Lima-Hamilton Corp.). U. S. 2,469,342, May 3. Method and apparatus for extrusion molding.

POLYMERS. J. C. Patrick (to Thiokol Corp.). U. S. 2,469,404, May 10. Heating formaldehyde with a glycol thioether and obtaining a polymer.

TEXTILE TREATMENT. D. H. Powers and E. H. Rossin (to Monsanto). U. S. 2,469,407-8-9, May 10. Finishing textile fabrics by treating with aqueous alkylene polyamine and a salt of styrene-maleic anhydride copolymer and curing the resin.

(*Please turn to page* 126)

WHEN PLASTICIZERS MIGRATE— TROUBLE COMES TO THE SURFACE



MORAL:
Plasticize your vinyl films with
PARAPLEX

You can't keep fugitive plasticizers under cover. They migrate from one surface to another . . . volatilize and leave vinyl films stiff and brittle . . . rub off on clothing . . . *ruin furniture by sticking to varnish and lacquer, by actually removing the finish!*

The PARAPLEX plasticizers are your best insurance against migration. Once a part of vinyl compounds, they stay there—despite constant rubbing, high heat, and prolonged contact with varnished or lacquered surfaces and baked finishes. They are your guarantee of permanent plasticization—of permanent customer satisfaction.

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Write to Department MP-2 for technical literature describing PARAPLEX G-25 and PARAPLEX G-50.

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Telephone — Bridgeport 7-4293

Wm. A. Chalverus, 2606 N. Fifth St.
Philadelphia, Penna.
Telephone — GArfield 3-3322

INSOLUBILIZATION. A. E. Broderick (to Carbide). U. S. 2,469,431, May 10. A water-insoluble product is prepared by preparing a solution of a water soluble cellulose ether, an amide such as carbamide, and formaldehyde, adjusting pH to 7.5 to 9.0, and heating.

TANNING AGENT. J. S. Kirk (to Du Pont). U. S. 2,469,-437, May 10. Tanning agents comprising quinone-resorcinol polymers.

CATION EXCHANGE. F. C. Nachod and W. Wood (to Permutit). U. S. 2,469,472, May 10. A cation exchange resin comprising a sulfonated copolymer of indene and cyclopentadiene.

ANION EXCHANGE. J. R. Dudley and L. A. Lundberg (to American Cyanamid). U. S. 2,469,683-4,92-3, May 10. A water-insoluble resin prepared by reacting an alpha-chloro-beta, gamma-epoxy hydrocarbon, and an alkylene polyamine.

RESIN. L. M. Minsk and W. O. Kenyon (to Eastman Kodak). U. S. 2,469,696, May 10. A water-soluble polyacrylamide prepared by adding polyacrylyl chloride dissolved in acetone to liquid ammonia.

TANNING. C. Riehs (to U. S.). U. S. 2,469,787, May 10. Tanning with sulfonated phenol-formaldehyde resin.

POLYMERIZATION. J. B. Rust (to Montclair Research). U. S. 2,469,788, May 10. Polymerizing an isoolefin and an unsaturated ketone in the presence of a Friedel-Crafts catalyst.

COPOLYMERS. J. G. Lichty (to Wingfoot). U. S. 2,469,-833, May 10. Copolymers of butadiene and alkyl esters of alpha, beta-dichloroacrylic acid.

COPOLYMERS. M. W. Renoll (to Monsanto). U. S. 2,469,845, May 10. Rubbery copolymers of trifluoromethyl vinyl aromatic compounds.

SILICONES. J. Marsden and G. F. Roedel (to G.E.). U. S. 2,469,883, May 10. Methyl silicone elastomers.

EXTRUSION. K. E. Stober (to Dow). U. S. 2,469,999, May 10. Mixing head for extrusion machines.

COLORING. K. E. Stober (to Dow). U. S. 2,470,001, May 10. Continuous process for producing uniformly colored articles of vinyl aromatic polymeric material.

CONDENSATES. J. T. Thurston and R. B. Warner (to American Cyanamid). U. S. 2,470,081, May 10. Water soluble alkylene oxide condensates of dimerized fatty acid alkylol amides.

MOLDING. J. J. Booth. U. S. 2,470,089, May 17. Method of molding a plastic shoe.

PHENOLIC RESIN. H. L. Bender and A. G. Farnham (to Bakelite). U. S. 2,470,130, May 17. Treating a condensate of phenol and formaldehyde to render it caustic resistant.

POLYETHYLENE. S. J. Hetzel and R. M. Kennedy (to Sun Oil). U. S. 2,470,166 and 2,470,171, May 17. Polymerizing ethylene by contacting with silica gel, chromia, and nickel or cobalt.

POLYMERS. W. J. Hornibrook (to Canadian Industries). U. S. 2,470,168, May 17. A polymeric composition prepared by forming a mixture of 4-vinylcyclohexene dioxide and a cellulose ester in the presence of a polymerization catalyst.

OLEFIN POLYMERS. L. Schmerling (to Universal Oil). U. S. 2,470,190, May 17. Polymerizing olefins in the presence of a metal phosphate catalyst.

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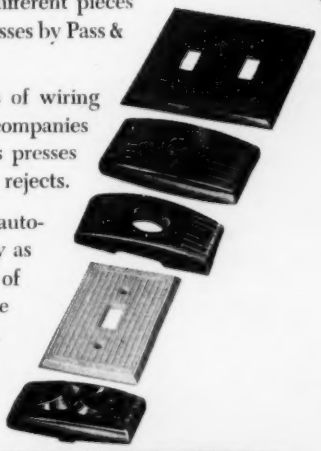
THESE plastic parts are just 12 of many different pieces currently molded on Stokes automatic presses by Pass & Seymour, Inc., of Syracuse, New York . . .

. . . and, Pass & Seymour, manufacturers of wiring devices, is one of hundreds of prominent companies who produce diverse plastic parts on Stokes presses . . . saving on labor, material, inventory and rejects.



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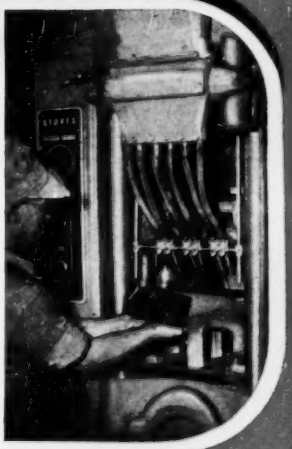

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SEPTEMBER 1949

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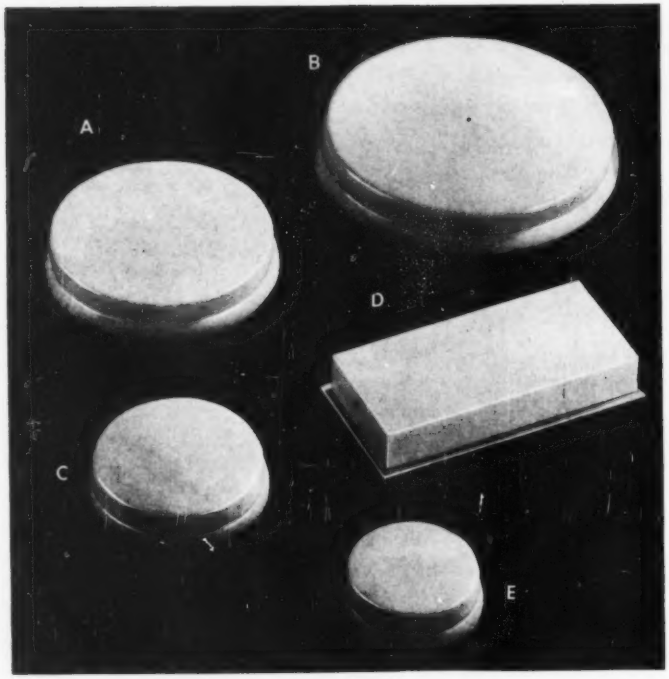

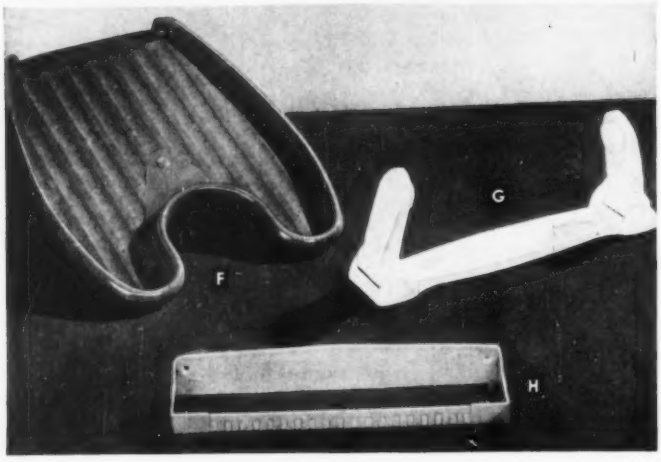

A to E—Cosmetic containers include (A) cream base or small powder container, polystyrene, or cellulose acetate, 2½ in. wide; (B) pancake powder container, urea, 3½ in. wide; (C) dry rouge container, cellulose acetate, 2 in. wide; (D) mascara container with mirror inside cover, cellulose acetate, 3 in. long, 1½ in. wide. (E) lip or cream rouge container made of cellulose acetate, 1½ in. wide. All containers come in white, peach, red, pink, blue, ivory, and black. Special colors molded to order. All closures on containers, except mascara box, are threaded. Trade mark may be hot-stamped in metallic leaf at company's shop.

A to E molded by Brandwell Sales Corp., 40-42 E. 19th St., New York 3, N. Y.

F—Shampoo rinse tray for home use. Rubber suction cups mounted on stainless steel bracket holds tray on any kitchen sink or bathroom basin. Made of polystyrene in red, green, yellow, and black. Each tray, 15 in. long by 12½ in. wide, is packed in display box, 2 doz. to shipping carton, 34 pounds.

G—Paper towel holder for kitchen or bathroom, 13½ in. long, holds regular or large-sized paper towels. Complete with screws for fastening to wall. Made of polystyrene, it comes in white, red, and green. Each holder is sealed in cellophane bag, packed 1 doz. to carton, each carton 8 pounds.

H—Utility shelf for kitchen, bathroom, or bedroom, is 12 in. long by 2½ in. wide. Can be used for spices, cosmetics, bottles of shampoos or colognes, tooth paste, etc. Comes with wedges and screws for installation. Made of polystyrene in white and pastel shades of green, blue, or peach. Individually wrapped, 1 doz. to carton. Shipping weight 10 lb. per carton.

F to H molded by Victory Mfg. Co., 1722 W. Arcade Pl., Chicago 12, Ill.

Molders are invited to submit samples of stock products to be described on this page as space permits. Address samples and detailed information to Stocks Molds Editor, Modern Plastics, 122 E. 42nd St., New York 17, N. Y.

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Appearance	Oily, water-white liquid
Odor	Substantially none
Acidity (as Phthalic Acid)	0.01% by weight max.
Specific Gravity 20/20°C.	1.047-1.049
Assay (ester content)	Min. 99% by weight
Distillation @ 5mm Hg, °C.	173-177
Refractive Index @ 20°C.	1.4910
Viscosity—centipoises	
@ 5°C.	43.9
@ 25°C.	16.2
@ 50°C.	6.7
Weight per gallon	8.75 lbs.

Containers: 50-55 gal. one-way steel barrels

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BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery

"Ion Exchange Theory and Applications," Edited by Frederick C. Nachod.

Published by Academic Press, Inc., 125 E. 23rd St., New York 10, N. Y. Price $8.50. 411 pages.

Seventeen experts cooperated in the preparation of the 16 chapters which make up this work. The major part is devoted to the various uses of ion exchange, but ion exchange equipment design and the fundamental properties of ion exchange resins are adequately covered.

"Oil Hydraulic Power and Its Industrial Applications," by Walter Ernst.

Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. Price $6.00. 366 pages.

Designed to meet the needs of the practicing engineer, this book covers the development, theory, and practical applications of oil hydraulics. Included are detailed sample calculations and designs for hydraulic components, pumps, and valves. The first portion of the book deals with fundamentals and covers the behavior of oil under pressure, its flow characteristics, viscosity, and behavior in hydraulic machinery. Succeeding chapters deal with the generation of oil hydraulic power by means of rotary and plunger pumps, its utilization in rotary and reciprocating motors, its control by suitable valves, and its transmission through piping, tubing, and fittings.

"Physics and Chemistry of Cellulose Fibres," by P. H. Hermans.

Published by Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, N. Y. Price $9.50. 534 pages.

Presented in this book, which is one of a series on high polymers, is the successful fusing of empirical knowledge of rayon with modern developments of the physics and physical chemistry of high polymers and cellulose. Part I deals with the molecular and crystalline structure of cellulose and with the behavior of chain molecules in solution and in the gel state. Part II covers the morphology and the physical and chemical properties of natural and artificial cellulose fibers. An extensive and fundamental discussion of the swelling and deformation processes in regenerated cellulose model filaments is presented in Part III. Many charts, diagrams, and photographs supplement the text.

Consulting services—The twelfth edition of this book, which supersedes the eleventh edition of "Classified Directory," has been brought up to date and enlarged to 132 pages. Beginning with an introduction on how to select a consulting chemist, the book contains lists of the Association's members and tells what fields they specialize or qualify in. Each member's qualifications are described and an index lists members alphabetically and by geographic location, including domestic and foreign branch offices. *Association of Consulting Chemists and Chemical Engineers, Inc., 50 E. 41st St., New York 17, N. Y.*

Grinding plastic scrap and fillers profitably—Capacities, ratings, and dimensions of the company's "KC" rotary knife chopper are presented in this four page bulletin. Illustrations and blueprints are included to show the specifications and construction of the chopper, which reduces thermoplastic scrap, sprues, gates, and rejects into uniform granules in one operation. *The American Pulverizer Co., 1117 Macklind Ave., St. Louis 10, Mo.*

Lucite resin—General information about the company's acrylic resin cast sheeting is contained in this 32-page booklet. One of the features is a chart listing the properties of acrylic cast sheeting. Of interest to the fabricator and home craftsman is a section on the handling and fabricating of the sheeting. Also included is a detachable inquiry form for use in connection with product problems where the company's technical advisory service is desired. *Plastics Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.*

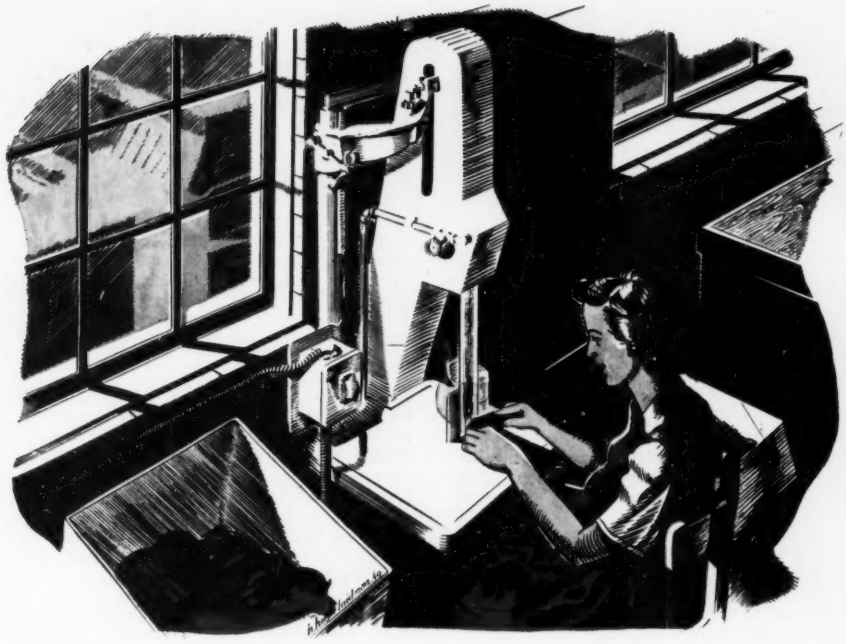
Jay Bee junior mill (Bulletin No. 149)—The Jay Bee junior mill, recommended for grinding operations, requiring a capacity of 300 to 1200 lb. per hour, is illustrated and described in this bulletin. A table of specifications is presented. *J. B. Sedberry, Inc., Tyler, Texas.*

If prices and sales dropped X%—Designed to enable the businessman to make a thorough review of his position today, this 32-page booklet outlines the steps to be taken now to face the uncertainties of tomorrow. Four points are emphasized: How to check your current position; How to analyze your vulnerability as prices drop, as volume falls; How to project sales, costs, cash, margins; Figuring your future position if you cut prices, if you spend more on promotion, if you iron out seasonal dips, if you invest in more efficient equipment, if you use lower grade materials, if you drop unprofitable sales, if you reduce overhead, if you subcontract work, and if you change your capital structure. Single copies are available at no charge. *Member Relation Div., The Research Institute of America, Inc., 292 Madison Ave., New York 17, N. Y.*

Bellows non-rotating air motors (Bulletin BM20R)—Various types of air motors and air motor accessories are described in this 16-page brochure. *Mr. William C. Richards, Jr., The Bellows Co., 222 W. Market St., Akron, Ohio.*

Mixing and blending equipment (Engineering Data Sheet No. 330-275)—Described in this data sheet is the complete line of improved types of mixing and blending equipment designed and sold by the company. Tables listing the wide range of sizes and capacities of the various units are included. *The H. W. North Co., 1213 Parade St., Erie, Pa.*

New industry comes to the South—The results of a comphehensive analysis of southern industrial assets are contained in this 32-page booklet which aims at "practical suggestions for constructive action." *The booklet is available for $1.00 from the National Planning Association, Washington, D. C.*



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Apply the 2-Factor Formula

The two factors are (1) *quality abrasives* and, (2) *their correct application.* You'll get better finishes at lower cost when you apply these factors to the finishing of plastics. Here's how you go about it...

To apply the *quality factor,* specify abrasives by CARBORUNDUM — for these products are the best that can be made. Belts, in both waterproof and dry backings, cut fast and clean without shedding, gumming-up, or glazing. These and other forms are available to meet the conditions imposed by type of equipment, material, finish, or production rate. For *correct application,* the name CARBORUNDUM is again important to you, for you can call upon our distributors and our staff for worthwhile assistance. Technically informed, widely experienced in the application of abrasive products to finishing plastics, these men can make important contributions to the quality of your finishing and overall finishing costs. Where necessary, they can draw upon the vast technical resources of The Carborundum Company to help solve difficult production problems. It will pay you to enlist their services. Simply write The Carborundum Company, Niagara Falls, N. Y.

COATED ABRASIVES BY

CARBORUNDUM

TRADE MARK

BELTS SHEETS ROLLS DISCS

New Plant of the Coated Products Division

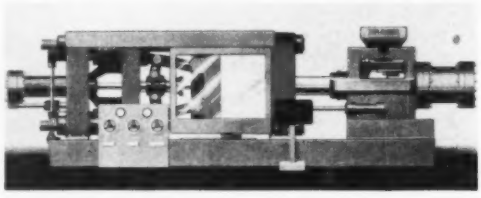
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

NEW MACHINERY AND EQUIPMENT

60-oz. injection molding machine—Reed-Prentice Corp.: Worcester 4. Mass., announces the addition to its line of Model 10J. a 60-oz. injection molding machine which will produce 60 oz. shots of cellulose acetate or 48 oz. shots of polystyrene. Economical production of large pieces is made possible by the machine's maximum plasticizing capacity of 250 lb. per hour. It has a maximum casting area of 350 sq. in.; die plates measure 60 by 60 inches. Piping, electrical controls, and hydraulic equipment are mounted as a separate unit outside the base of the machine. The distance from the center of the heating cylinder to the floor measures 50 in., making the molded pieces accessible to an operator of normal height.

The mold locking mechanism provides 1000 tons clamping pressure and a 24 in. movement independent of mold thickness. The stroke can be shortened for operation of thin molds. A copper core heating cylinder, used in other company machines, is employed——but with an increased capacity. A new wedge-type clamping device holds the heater in place and permits easy mounting and removal. The movement of the die plate and plunger are automatically controlled by a new timing panel. However, manual operation is instantly obtainable. Arrangement of the die plates permits automatic ejection of finished pieces both at the center and at the four corners.

Other specifications include: Hopper slide, 225 cu. in.; cu. in. molded per shot, 80; capacity of feed hopper, 125 lb.; maximum shots per hr., 90; diameter of injection plunger, 5 in.; diameter of hydraulic injection cylinder, 17½ in.; pressure on material, 24,500 p.s.i.; total pressure on injection plunger, 481,000 lb.; stroke of plunger, 19 in.; speed of plunger, 88 in. per min.; 7½-sec. injection stroke; space between tie bars, 33 by 41 in.; tie bar diameter, 8 in.; maximum die height, 40 in.; minimum die height, 0; mold opening pressure, 70 tons; combined capacity of hydraulic pumps, g.p.m., 92; maximum pressure of hydraulic pumps, 2000 p.s.i.; oil reservoir, 300 gal.; dimensions, machine only, 310 by 80 by 82 in.; weight with motor, 60,000 lb.; weight with motor boxed for export, 71,500 lb.; and motor required, 80 hp.



Above: Sixty oz. shots of acetate or 48 oz. shots of polystyrene can be produced on this new injection molding machine. Below: Front elevation drawing of the same unit

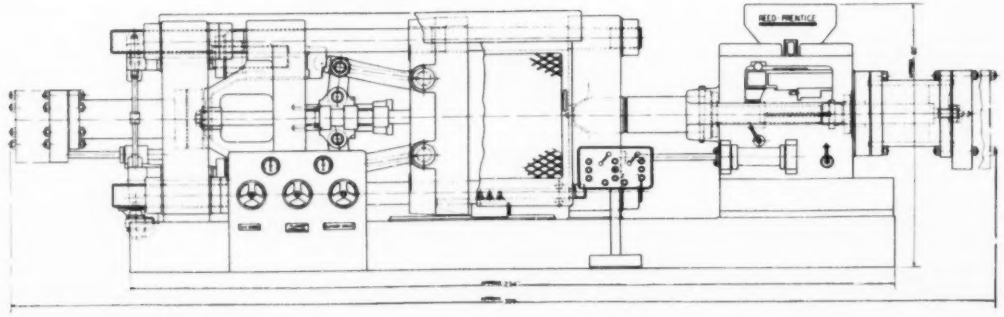
Paste mixer—Charles Ross & Son Co., 148 Clason Ave., Brooklyn, N. Y., introduces a heavy duty 90-gal. paste mixer featuring finger tip control for a wide range of speeds. Mixing arms consist of four blades or stirrers, each set of two stirrers revolving on its own axis and driven in a planetary manner around the can. The stirrers are raised vertically from the can by a self-operating hydraulic unit. The can itself has a large outlet gate on one side and is mounted on casters for easy transportation.

Gage using radioactive isotopes—The Tracerlab beta gage, Model SM-2, first in a series of industrial measuring and control instruments currently under development using radioactive isotopes, is announced by Tracerlab, Inc., 55 Oliver St., Boston 10, Mass. It has an inherent accuracy of ±0.05% of sample thickness or ±0.03 mg./cm.^{2}, whichever is larger. Measurement of cellophane films, plastic and rubber sheets up to 3/16 in. thick, paper ranging from heavy board to extremely thin condenser paper less than 0.002 in. thick, sheet metal including steel and brass up to 0.040 in. thick, coated textiles, etc., are among uses to which it may be put.

Essential components of the gage are a source of beta radiation from strontium-90 and a radiation detector.

The gage uses a Brown Electronik recorder and the gage standardizes itself automatically every 30 minutes. A non-recording industrial beta gage and a laboratory model are also available.

Valve—Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill., announces a four-way Mastair valve of the balanced spool type which is controlled by one

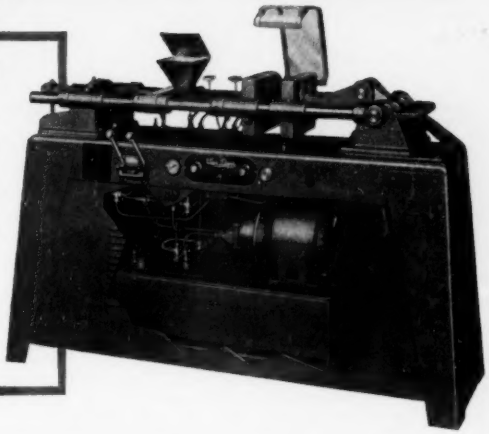


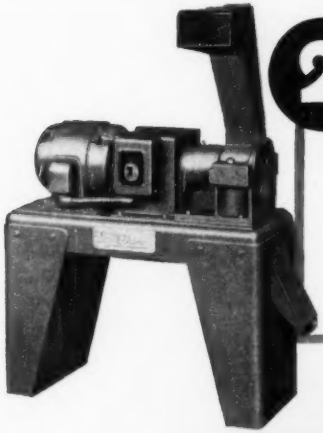
Save 2 WAYS with this
VAN DORN Equipment

1 VAN DORN PRESS

Here's the *best buy* in the 1 oz. class for injection molding of practically all thermoplastics including nylon. This versatile press:

Is Moderately Priced
Operates 8 Hours For Under 1 Dollar
Uses Less Expensive Molds
Can Be Set Up By 1 Man In 20 Minutes





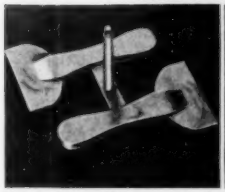
2 VAN DORN GRINDER

This scrap granulator cuts operating costs still further, by grinding rejects, sprues, etc. for re-use. It features:

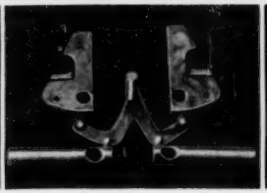
Sturdy, All-Steel Construction
Efficient Cutting Chamber
Ease of Cleaning

Profitably Produced on VAN DORNS:

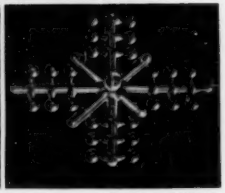
***Free* BULLETIN** gives complete data. *Send for it NOW!*



Polystyrene 4/5 oz. 4"x4"



Polystyrene 3/4 oz. 6½"x4"



Polystyrene 1/2 oz. 4¼" dia.

We Make Mold Bases for Van Dorn Presses.

THE *Van Dorn* IRON WORKS CO.
2687 EAST 79th STREET · CLEVELAND 4, OHIO

four-way or two three-way pilot valves. Few fittings are needed because of straight line piping. Pipes may be connected to the bottom or sides as desired. By removing end caps, the spool and sleeve assembly can easily be taken out. Parts are interchangeable in any size. Capacities are ⅜, ½, ¾ and 1 in., pipe size. Further information may be obtained by writing the company for Catalog 251.

Cut-off attachment—A rotary cut-off attachment for extruding machine conveyors is offered by Barker & Davis Machine Co., Inc., Leominster, Mass. Multiple blades—six in all—cut through the stock and position it for the next cut on the conveyor attachment. Said to

cut sheets and tubes without a sagging action, it is controlled by timer and solenoid activated single revolution clutch. It will take any desired length up to 30 ft.; longer cuts are attained by minor gear changes.

Mold base—Detroit Mold Engineering Co., 1217 Central Ave., Hillside, N. J., announces a standard mold base measuring 13¾ by 23½ in. for use on 8 and 12-oz. presses. This base was formerly supplied on special order only. In its new standard form, it has been reduced over 30% in price. Except for length, it is identical with the present 1318 series and will be available in stripper plate models and S series as well as the standard A series.

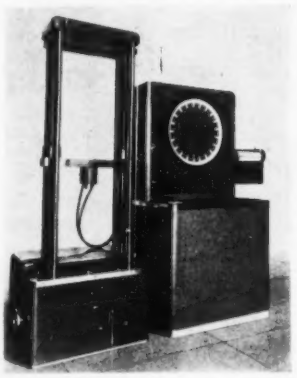
Alkyd resin press—F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia 20, Pa., introduces Model 200-H, a fully automatic press for molding fast-curing alkyd resins. This press is said to have increased output 450% in a high production automotive part. Production was increased from 4 per min. using general purpose materials on a conventional press to 18 per min. using alkyd resin on the Model 200-H.

Slitting machine—B. J. Philips Co., 110 W. 30th St., New York 1, N. Y., announces the automatic Judelshon heavy duty #360-A slitter especially developed for cutting 60-in. material into trouser waist-bands, bindings, ribbons, shoe trimmings, welting for furniture and automobile furnishings, type writer ribbons, etc. The slitter features a 15-in. knife for cutting a 12-in. diameter roll, automatic feed for slicing the entire roll into accurate sections up to 4-in. wide, ability to cut the entire roll before removing the slit material, variable speed drive, and forward or reverse motion for best cutting results.

Sealers—For thermoplastic bonding, Special Products Co., 219 E. North Water St., Chicago 11, Ill., is offering a line of Calectron dielectric sealing presses and generators. Adequate shielding prevents radiation. Power control reduces peak potential proportionately to power output requirement for sealing thin materials. A timer which automatically shuts off the generator when the seal is completed controls length of power dwell. The sealing presses, which provide a matched load to almost any make of dielectric sealing generator, are available in two sizes: No. 1 for use on either ½ or 1 kw. generators and No. 2 for 2 or 3 kw. generators. Calectron generators are available in three sizes: ½, 1, and 2 kw.

Slitter and rewinder—A contact type slitter and rewinder which will handle a variety of plastics, papers, boards, fabrics, and foils is announced by the Hobbs Mfg. Co., Worcester 5, Mass. It is designed for the smaller manufacturer, converter, or commercial plant, and for secondary operations in larger plants. The main slitting roll, made of high carbon alloy steel, is mounted on needle bearings. Cutters with blades of alloy steel are mounted on a rigid cast iron cutter bar extending across the front of the machine. Each cutter can be mounted, dismounted, or adjusted without disturbing other cutters. They can be set to a minimum width of 7/16 inch. The two rewind arms are designed to take care of rewinds to the full capacity of the machine—24-in. diameter. Standard equipment for rewinds are splined shafts 1 1/16 in. in diameter. Arbors from 1 to 3 in. in diameter are available for materials to be rewound on cores. Micrometer adjustments can be made while the machine is in operation. Three sizes of machines are available—30, 40, and 45 in. with slitting rolls of 31½, 41½ and 46½ in. respectively. All have parent rolls of 40 in. max. diameter and rewind rolls of 24 in max. diameter.

Testing machine—A 5000-lb. capacity universal testing machine, Model PTE, which is suitable for testing plastics, fine wire, light structures of plastic, wood, or metal, textile materials, etc., is announced by The Baldwin Locomotive Works, Philadelphia 42, Pa. Hydraulic and pneumatic load cells are used as load-sensitive elements in the weighing system. The hydraulic cell provides four standard load ranges: 5000, 1000, 200, and 50 pounds. When specified, an air cell will provide additional ranges of 10 and 2 pounds. Tension space may be 3⅜ to 51 7/16 in. and compression space 0 to 48 inches. Clearance between vertical screws is 18¼ inches. Loads are indicated on a 24-in. masked dial with a 66-in. scale. Solenoid-operated air valves permit instant shifting of load ranges. Tension and compression loads are applied by a straining crosshead which is motor-driven by two vertical screws giving a 48-in. stroke. Loading speeds are held constant by electronic controls in a 400:1 range of 0.05 to 20 in. per minute. Accuracy of the load indications is within 0.5% of reading, or one scale division, for the lower three ranges. A recorder may be used with the machine. It will plot stress-strain curves with 10-in. ordinate for one-half and full capacity of any range. The machine is also designed for automatic reversal and cycling of loads.



Package
to catch a customer's eye
This package, made of Kodapak Sheet, has sparkle to catch a cruising eye . . . brilliant, water-clear transparency to show merchandise at its best . . . plus toughness and stability for lasting service. You'll find Kodapak Sheet in two basic forms: Kodapak I Sheet, cellulose acetate, gauges up to 0.060″; Kodapak II Sheet, cellulose acetate butyrate, gauges up to .002″. Both are made to the same high standards as Kodak photographic film base. For further information about Kodapak Sheet, consult the nearest representative, or write Kodak. If your problem is particularly complicated, a visit to the Kodapak Demonstration Laboratory in Rochester will prove helpful. Write for an appointment.
Cellulose Products Division, Eastman Kodak Company, Rochester 4, N. Y. Sales offices in New York, Chicago. District sales representatives in Cleveland, Philadelphia, Providence. Pacific Coast distributor: Wilson & Geo. Meyer & Co., San Francisco, Los Angeles, Portland, Seattle. Canadian distributor: Paper Sales, Limited, Toronto, Montreal.
Kodapak Sheet
FOR THE DISPLAY YOU WANT . . . THE PROTECTION YOU NEED
"KODAPAK" IS A TRADE-MARK
Kodak

"You mean that's all you paid for that job? I never knew you could buy Sillcocks-Miller quality for that kind of money"

PRECISION-FABRICATED PLASTICS

Complete facilities for cutting, printing, stamping, cementing, milling, turning, blanking, drilling, drawing, forming, electronic sealing, laminating and assembling all types of plastics.

The SILLCOCKS-MILLER Company
10 West Parker Avenue • Maplewood, New Jersey

Production of

FOR THE purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant, for transfer to other plants of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

The figures for sales given in the present report are not comparable with those for consumption in

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled by

Materials	*Total prod'n first 5 mos. 1949*
CELLULOSE PLASTICS:[a]	
Cellulose acetate and mixed ester plastics:	
Sheets, continuous:	
Under 0.003 gage	2,867,303
0.003 gage and over	3,137,893
All other sheets, rods, and tubes	1,882,853
Molding and extrusion materials	20,945,072
Nitrocellulose:	
Sheets	3,045,843
Rods and tubes	687,712
Other cellulose plastics[b]	4,413,312
PHENOLIC AND OTHER TAR ACID RESINS:	
Laminating	17,380,852
Adhesives	9,701,068
Molding materials[a]	51,067,424
Protective coatings (containing less than 10% modifier)	6,699,474
Miscellaneous uses, including casting	17,133,003
UREA AND MELAMINE RESINS:	
Adhesives	15,194,662
Textile- and paper-treating resins	10,384,288
Protective coatings, modified and unmodified	6,370,775
Miscellaneous uses, including laminating and molding[c]	21,740,111
STYRENE AND STYRENE DERIVATIVE POLYMER AND COPOLYMER RESINS:	
Molding materials[a]	69,191,153
Miscellaneous uses[d]	9,695,419
VINYL RESINS:	
Sheeting and film, including safety-glass sheeting[a]	55,938,857
Adhesives (resin content)	4,283,455
Textile- and paper-treating resins, including spreader and calendering types (resin content)	11,912,022
Molding materials (resin content)	27,655,345
Miscellaneous uses (resin content)[d]	7,981,638
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:	
Molding materials[a, f]	17,148,663
Protective coatings[e]	18,232,720
All other uses[b]	63,312,222

[a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Excludes data for protective coatings. These data are included with miscellaneous coatings to avoid disclosure of the operations of individual companies. [e] Statistics include data for virtually all major manufacturers of protective coating resins. The coverage in this report

Plastics Materials

the producing plants plus shipments to other plants given in earlier reports. The figures for production given in the present report, however, would be comparable with figures for consumption in producing plants plus shipments given in earlier reports except for inventory changes. From month to month these changes in inventory may be substantial, but over several months they tend to even out.

IN POUNDS FOR APRIL AND MAY 1949
U. S. Tariff Commission

April 1949		*May 1499*	
Production	*Sales*	*Production*	*Sales*
508,865	563,679	248,532	334,402
525,492	514,718	733,727	582,744
294,530	338,067	667,908	290,202
4,609,974	4,636,633	3,387,867	3,701,734
635,947	549,912	600,622	502,621
113,783	111,518	153,319	111,759
1,021,724	663,776	707,942	422,120
4,797,190	1,787,085	2,419,341	1,491,055
1,791,434	1,631,984	2,225,414	1,924,656
8,941,553	7,362,111	7,197,285	6,957,001
864,727	797,774	1,396,478	964,419
2,729,844	3,002,626	2,972,544	3,429,115
3,426,485	3,217,932	2,855,626	2,931,389
1,809,523	1,440,385[1]	1,328,945	1,343,956
1,066,604	757,887	1,125,841	759,226
3,263,684	3,353,731	3,877,880	3,003,861
15,830,457	13,580,199	14,527,403	13,023,810
1,717,388	1,683,787	1,803,724	1,636,090
13,600,000[1]	13,000,000[1]	10,986,269	10,695,954
1,054,982	818,127	985,537	832,555
2,489,723	2,205,475	2,212,216	1,844,996
4,775,000[1]	4,760,000[1]	4,817,121	5,055,734
1,693,765	819,602	1,405,714	621,703
3,597,437	3,106,375	4,173,018	3,481,138
3,558,455	3,370,443	3,875,348	3,703,961
10,949,500	9,962,760	10,447,017	9,745,849

is about 90% complete, based on final returns for the year 1947. [f] Includes data for acrylic, aniline-formaldehyde, polyethylene, nylon and other molding materials. [g] Includes data for coumarone-indene, petroleum polymer and condensation, silicone, and other protective coating resins. [h] Includes data for acrylic, alkyd, coumarone-indene, nylon, petroleum polymer and condensation, silicone and other plastics and resins for miscellaneous uses. [i] The totals given here have been revised from first reports.

GET the FACTS

The LOWEST PRICED 4 oz. Plastics PRESS ON THE MARKET!

$5,500.

MacRay

TOPS in Value and Performance

NOT TOO BIG! NOT TOO Small!

Gives Profitable Volume Production at Unusually Low Operating Costs

Compare the new 4 oz. MacRay Injection Press with other plastics presses. You'll be amazed at its versatility—its sound, modern design—its capacity and low price!

The new MacRay handles a wide range of jobs—turns out fast, profitable volume production at low operating cost. Utilizing many standard tested and proved features, the MacRay is rugged and tough—built for long, dependable, trouble-free service. Clamping and injection mechanism, heating cylinder and hydraulic system are simplified and efficient.

The MacRay 4 oz. is an outstanding buy. Investigate its many advantages today!

Write . . . for full information and specifications

MacRAY ENGINEERING CO.

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Consumer items suitable for distribution through retail and chain stores.

offering:

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505 Fifth Avenue
MUrray Hill 7-0760 **New York 17, N. Y.**

Ejector Pins — **Pinions**

Screws and Dowels —all types — **Baffles** —brass, for water lines

Cutters —tapered, milling — **Long Drills** —for water lines

Abrasives —powder and compound — **Ejector Boxes**

Sprue Reamers —tapered — **Pipe Plugs** —brass

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It's to your advantage to buy mold makers' supplies from DME—they're made right, priced right, and delivered promptly.

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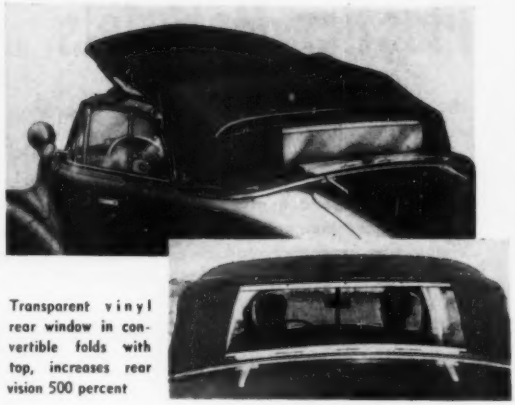


Transparent vinyl rear window in convertible folds with top, increases rear vision 500 percent

Flexible Car Window

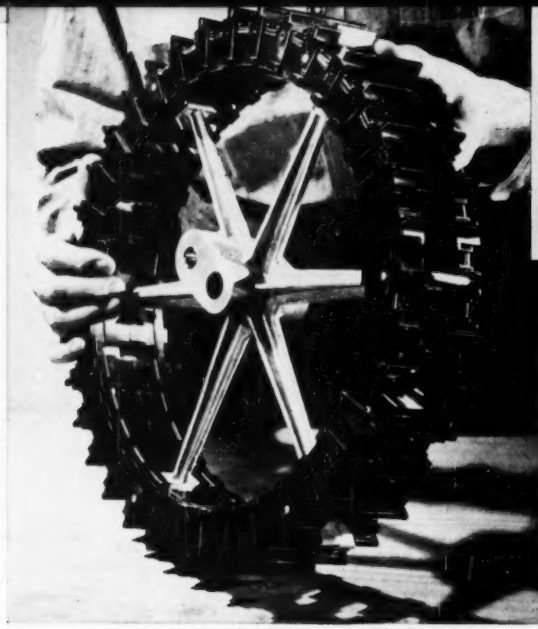
LACK of adequate rear vision has long been one of the main disadvantages of convertible cars. The size of a glass rear window has always been limited by the fact that it must fit between the folds of the top. Attempts to get around this limitation in the past have included hinged glass windows double the usual size, and acrylic windows which must be removed when the top is folded.

The latest solution to the problem is a completely flexible rear window made of transparent vinyl. The window, which can be installed easily on most recent model convertibles, is said to increase rear vision 500 percent. See-Clear Co., New York, manufactures the new windows of Vinylite VT1928, a formulation with extra transparency and flexibility.

The window is 0.040 in. thick, and about 40 by 20 in., the exact size depending upon the particular car in which the window is to be installed. The vinyl sheet is mounted on an aluminum frame and has rubber strips mounted on the outside surface near the edges. These strips form a weather-proof seal between the window and the canvas top.

The vinyl is bonded to the metal and rubber under 15 tons pressure, using one adhesive for the metal-to-vinyl bond and another for the vinyl-to-rubber bond. Both adhesives are manufactured by Minnesota Mining & Mfg. Co., St. Paul, Minn. The edge of the window is bound with a plastic tape made by Minnesota Mining.

When the window is installed in a convertible, the top is opened slightly to make the rear window opening slightly smaller. After the window has been clamped in place, the top is closed, thus stretching the vinyl slightly and thereby insuring a tight, wrinkle-free fit.



Molder: Plastic Fabricators, Inc.

BAKELITE NEWS

NO. 7

NOTES FROM BAKELITE CORPORATION ON BETTER, FASTER, LOWER COST PRODUCTION WITH "BAKELITE" PLASTICS

$313 Savings Per Machine Through use of BAKELITE Phenolics!

❶ Here's how one manufacturer obtained a better product at considerably lower cost. BAKELITE Phenolic Plastics replaced die-cast metal for the four dispensing rings of the new "Kenro" ice cream vending machine. Direct savings totalled $304 for the four rings. Additional savings of $9.12 per machine were obtained by replacing eight shaft bushings of soft metal that cost $1.20 each, with BAKELITE Phenolic molded bushings costing only 6¢ each. The plastic parts contributed further indirect savings by reducing the weight of the machine 30 pounds, thereby lowering shipping costs, and by the elimination of several machining and finishing operations.

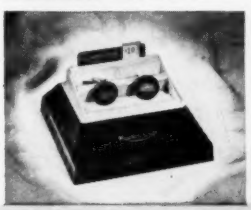
It may pay you, too, to redesign your products or component parts around BAKELITE Phenolic Plastics.

PACKAGES that Sell and Keep on SELLING

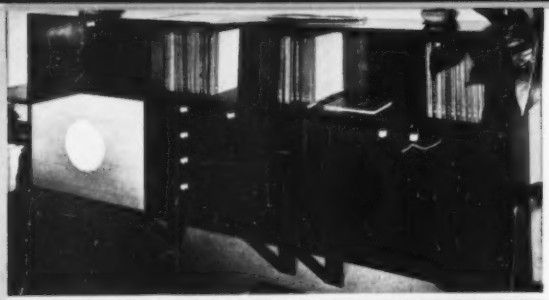
❷ Everyone gains from the new BAKELITE Styrene Plastic packages designed by Walter Dorwin Teague for Kreisler-Craft men's jewelry. Not only do these packages sell goods, but they continue to build goodwill through their re-use value to the consumer. They appeal to the retailer because they can be converted instantly into eye-catching displays, or can be nested on dealers' shelves for mass display effect. Above all the use of BAKELITE Styrene Plastics enabled Kreisler to develop a package with exceptional quality appeal, at a cost that was well within the normal margin allotted for packaging these popular priced jewelry items.

BAKELITE Styrene Plastics are a "natural" for packaging. They are light, strong, lustrous, available in an unlimited range of colors, transparent, translucent, and opaque. They are rapidly and inexpensively fabricated by injection molding into intricate shapes, and give fine, clear cut reproductions of mold details. Let us show you how to package profitably with plastics.

Molders: Cowan-Boyden Corp., General Electric Co.



MORE BAKELITE NEWS ON NEXT PAGE



Bakelite

TRADE-MARK

PLASTICS

BAKELITE CORPORATION

Unit of Union Carbide and Carbon Corporation UCC

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- ☐ 2. BAKELITE Styrene Plastics for Packaging
- ☐ 3. BAKELITE Phenolic and Urea Resin Adhesives
- ☐ 4. BAKELITE Styrene Plastics for Toys
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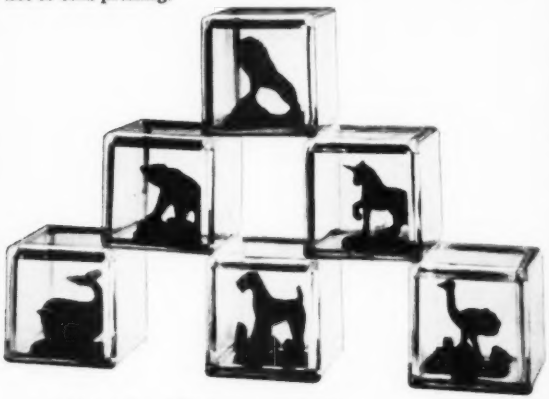
❸ Heard about BSC? It stands for built-in storage components—a progressive new idea in furniture design and construction that bridges the gap between portable furniture and prefabricated storage wall systems. Built by Herman Miller Furniture Company from designs by George Nelson, the BSC furniture units illustrated owe their durability to good design plus BAKELITE BCU-22 Urea Resin Glue. The glue is employed in the manufacture of the fine plywood panels, and also in assembling the various furniture components. But the best news of all is that these quality bonds are obtained at the lowest possible cost because BCU-22 is the most economical of all synthetic resin adhesives available today. It is suitable for either hot or cold pressing.



ORIGINALITY Pays Off With BAKELITE Styrene Plastics

❹ Originality of design applied to colorful strong, BAKELITE Styrene Plastics has brought wide acclaim to these unique "Kusan" toys. Illustrated are the basic transparent blocks containing sealed-in animals and other figures that appeal to little tots. These blocks can be assembled in various ways to provide roller-pull toys, rattles, and other equally intriguing play items. They are strong enough to take a beating, are smooth, washable, and non-shattering. They are designed and molded by Kusan, Inc., Plastics Division, who produce a great variety of Styrene Plastic toys in transparent, translucent and opaque effects.

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❺ Latest advances in protective coatings are color-stable, white and light-tinted enamels based on BAKELITE C-10 Resins. For example, Resin BJS-502 can be formulated into enamels that exhibit several unique qualities of particular importance to product finishing technologists. A single coat, either dipped on or sprayed on, provides high gloss and appearance equivalent to multiple coats of lacquer, yet the enamel air dries tack free in 5 to 15 minutes. When finishing schedules call for additional coats, the enamels can be recoated any time from 1 to 96 hours or later without lifting, when the recommended solvent balance is followed.

These coatings can also be baked rapidly to produce hard tough films with excellent color retention. Use the handy coupon to obtain further information.

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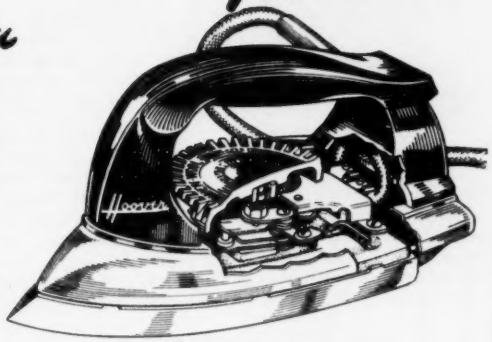

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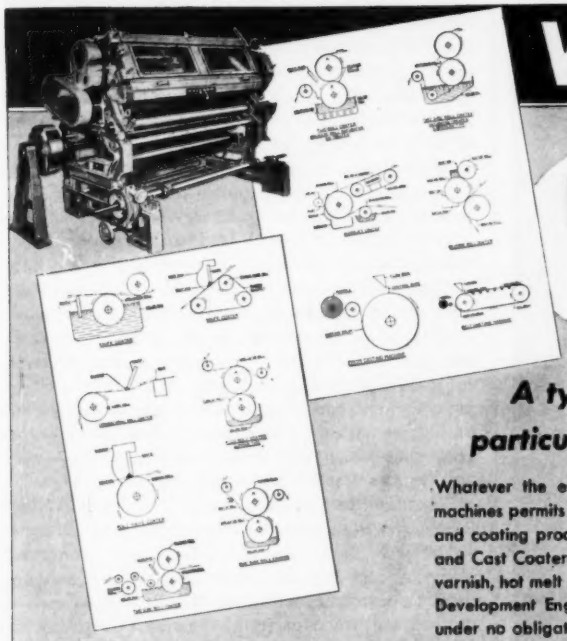

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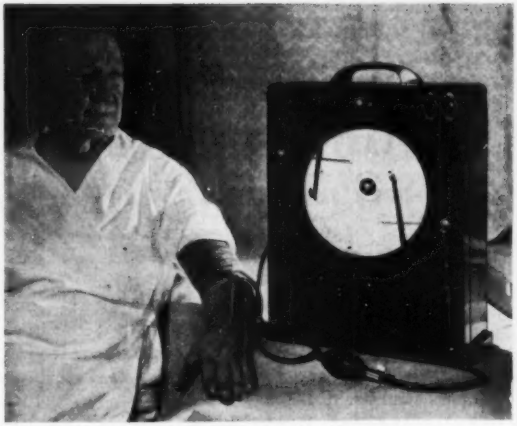


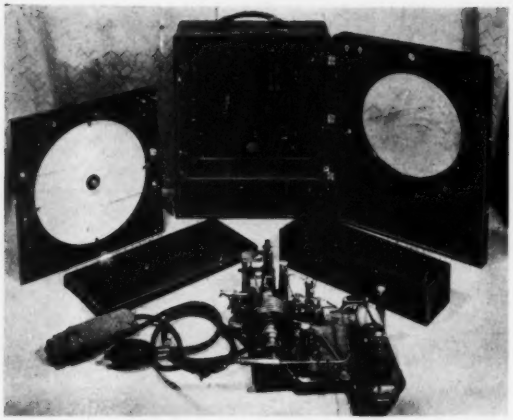
Highly sensitive diagnostic heart meter in molded phenolic case makes a graphic record of this patient's heart action

Diagnostic

THE Cameron Heartometer was developed some eight years ago to meet the medical profession's need for a highly sensitive diagnostic instrument which would provide a graphic record of the patient's heart action. About two years ago, the manufacturer, Cameron Heartometer Co., Chicago, Ill., ran into a serious production bottleneck. The shortage of skilled cabinet workers, rising labor costs, and difficulty of securing the types of veneers used in the instrument housing prompted Cameron officials to investigate the possibility of using a molded plastic case. It was desired to follow the design of the wooden cabinet, which measured approximately 17 in. high by 13 in. wide.

The job was referred to Plastic Molders, Inc., Chicago, which has made somewhat of a specialty of large compression molded pieces, including the urea silverware chest described in the February 1947, issue of MODERN PLASTICS, p. 96. Because of the size of the instrument case, mold costs were substantial. However, as is often the case in switching over to plastic from another material, production economies realized with the molded cabinet were so great that tooling and fixture costs had been amortized by the time 500 units had been produced.

Whereas the wooden cases, involving skilled fabrication, had cost the instrument manufacturer $23.50 each, the molded units, in mottled mahogany phenolic, cost approximately $7, or less than one-third as much. In addition, the plastic cases are uniform and the capacity of the single cavity molds affords 15 times the production potential attained with the former cabinets. Exceptionally sturdy, they meet all service conditions and may easily be lifted



Component parts of instrument include the cabinet proper, door, drawer, base. Phenolic handle makes it easy to carry

Heart Meter

and carried by means of the stock phenolic handle used.

Since the finished Heartometer is a precision instrument of extreme sensitivity, a wall thickness of ⅜ in. is used on the case to insure the necessary degree of protection. Plastic Molders produces all components of the cabinet except the base, which is molded by the Cameron firm on its own compression molding equipment.

The case proper, largest of the cabinet components, contains approximately 8 lb. of general purpose phenolic material. Utilizing electronic preheating of preforms, cure time on this part runs 8 minutes. The cycle on this piece, according to Fred Krone, chief engineer of Plastic Molders, is governed by shrink control considerations rather than by the cure itself. A large cam-action die is employed for this component, permitting the molding of the two large openings in the side of the cabinet. All openings in the part are cored except those which are drilled for attachment of handle and base.

The cabinet door, weighing about 3 lb., includes several cored openings, the largest being the circular window through which the paper chart may be observed. Two openings at the upper right hand corner of the door permit observation of signal lights on the instrument. A long stud molded on the inner surface of the door contacts the operating mechanism to turn the instrument on and off. The drawer, which is also molded of mottled phenolic material, weighs about ¾ pound.

Except for the drilling of the openings mentioned above, finishing operations on the molded cabinet parts are limited to flashing and polishing.

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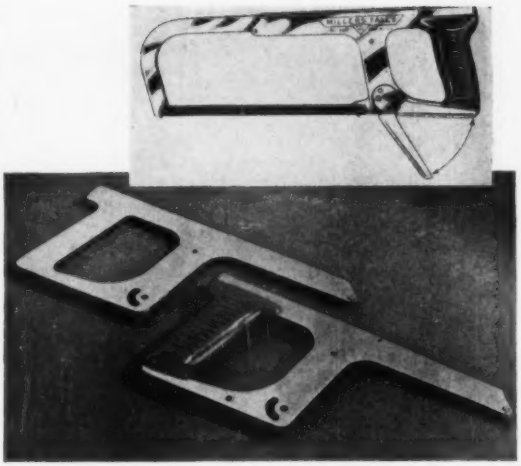

Acetate handle is injection molded directly on steel hack-saw frame. Handle is hollow to accommodate tension lever

Hack-Saw Handle

A CELLULOSE acetate pistol-grip handle molded directly onto a steel frame is an unusual feature of the No. 300 hack saw manufactured by Millers Falls Tool Co., Greenfield, Mass.

Bonding of the steel and plastic is said to increase greatly the strength and durability of the entire assembly. Shop tests proved that the handle could not be separated from the frame or broken off even when pounded with a hammer. Another advantage of this type handle is that a number of assembly operations are bypassed with a consequent gain in production speed and economy.

F. J. Kirk Molding Co., Clinton, Mass., molds the handles of red Lumarith in a two-cavity mold using an 8-oz. injection molding machine. It can turn out 1500 handle-and-frame units every 24 hours.

No flash on finished part

Tapered positioning pins locate the handles accurately in the mold which has a 5-in. core for producing a hollow handle. After the mold is closed, acetate is injected on the steel sections; the mold is designed so that there is no flash on the finished part. The core is removed from the back of the handle after molding, and the handle units withdrawn manually.

The double walled frame is stamped from sheet steel, then bent over on itself. Excepting the bent side, all sides are open. The space between the walls at the bottom and the lower part of the hollow handle accommodate a patented lever which is used to set blades to the right tension.

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Write for Waterbury Plastics Catalog

WATERBURY COMPANIES, INC.
South Main St. Waterbury, Conn.

Atomizer assembly consists of molded polyethylene bottle, extruded polyethylene tube, and molded urea cap and base

Atomizer-Bottle

AN injection molded polyethylene bottle is used as an atomizer in the home curl kit made by Kurl-Mist Inc., New York, N. Y. The wide-mouthed bottle is turned into an atomizer by screwing on a molded urea closure. An extruded polyethylene siphon tube and a molded urea base for the bottle complete the assembly. The kit also includes 12 transparent polystyrene curlers, and a special solution which is sprayed onto the hair before setting it.

The wide neck of the 2-oz. polyethylene bottle makes it easy to fill. The closure has a threaded lip which fits outside the neck of the bottle and another lip which fits inside so that the neck of the bottle cannot be squeezed away from the threads.

The base, which should be removed before dispensing the liquid, is molded to fit over the rounded bottom of the bottle. The flexibility of the bottle enables the user to slip the base off easily.

All plastic parts—the bottle, its base, closure, tube, and curlers—are supplied to Kurl-Mist by W. B. Associates, New York. The polythylene atomizer-bottle can be adapted for liquids other than the Kurl-Mist spray merely by varying the diameter of the polyethylene tube in the extruding process—the viscosity of the liquid under consideration determining the exact size. The size of the other parts need not be varied.

Although the bottle is now labeled with a paper band, either a silk screening process on the urea cap or printing on the polyethylene would be practicable.

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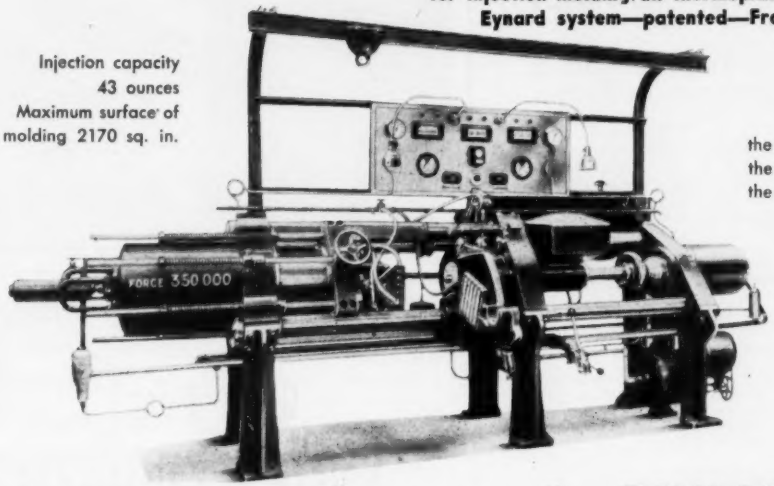

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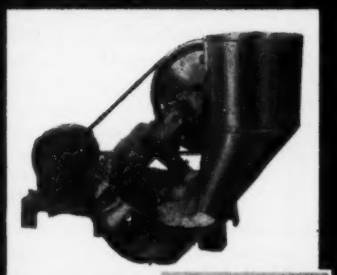

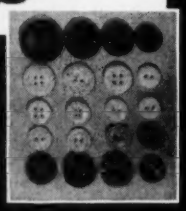

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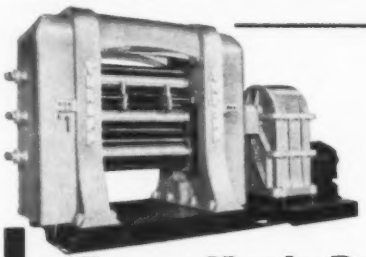

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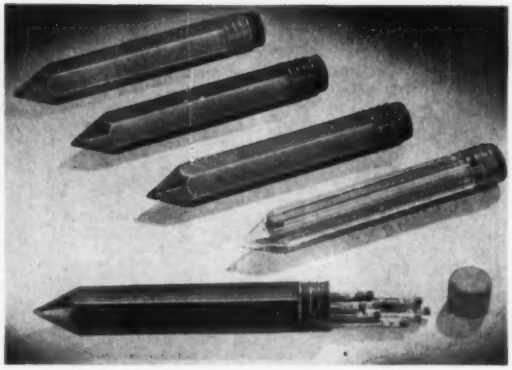

Pencil box is molded of polystyrene in the form of a pencil 10 in. long and 1½ in. in diameter. Plug is an eraser

Giant Pencil Molded of Polystyrene

A GIANT plastic replica of a lead pencil is being used as a novel container for lead pencils and is being marketed in several different ways. This rather unusual package is molded of Dow Styron polystyrene by the Plastics Div., Kusan, Inc., Nashville, Tenn., for the Linton Pencil Co., Lewisburg, Tenn.

The polystyrene pencil, which is 10 in. long and 1½ in. in diameter across the top, is molded in two pieces which are cemented together. The dozen lead pencils fit snugly inside the plastic replica. The large red eraser serves as a plug and also has utility value since it has about twice the rubber content of the ordinary five-cent pencil eraser.

Molded in four colors

The plastic giant pencil is molded in red, green, blue, and yellow. Twelve of the polystyrene pencils of assorted colors are packed in a shelf carton. An easel back display card is also provided for holding one of the transparent pencils as a sales aid.

Sold through three channels

At the present time the pencils are being sold through three channels of distribution: in gift shops where they and their contents are blank and suitable for monogramming; in department stores where they are sold both as a monogramming item and as an item across the counter filled with regular imprinted pencils; and in chain stores. In the latter instance, where the pencils are a regular listed item, the contents are commercially imprinted.

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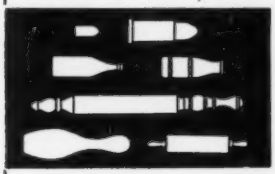

Illustrated here are several of the infinite number of shapes which we can grind for you from plastic, fiber, hard rubber, wood or other materials.

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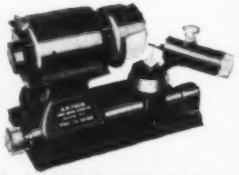

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Water cooler uses polystyrene sheet and laminated plastic for insulation, has transparent acrylic cover on water compartment. Ice cube trays are polyethylene

Water Cooler

POLYETHYLENE, polystyrene, acrylic, a resinous coating, and a laminated plastic are among the materials employed in the Sunroc Model 26 water cooler manufactured by Sunroc Refrigeration Co., Glen Riddle, Pa. The cooler supplies chilled water and has a 2 cu. ft. capacity storage compartment which holds three ice cube trays.

The polyethylene ice cube trays, made single width in order to fit into small size evaporator, are molded by Republic Molding Corp., Chicago.

A transparent molded Plexiglas cover on the water compartment allows a quick visual check of the water level. The cover is 3⅞ in. in diameter, ½ in. deep, and ¾₄ in. thick. A sheet of polystyrene, ⅛ by 6 by 10 in., is used as insulating material between the evaporator and water compartment to keep the water from freezing. Willson Products, Inc., Reading, Pa., supplies the sheet.

The interior of the top cover of the cooler is insulated with Phenolite, a laminated plastic made by National Vulcanized Fibre Co., Wilmington, Del. Corrosite, a coating combining both thermosetting and thermoplastic resins, encases the float assembly. A mercury switch which controls the water level is housed in the float.

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Electric keyboard typewriter has serrated-edge cutting knife (arrow) made of transparent acrylic. Knife permits operator to cut forms quickly (right)

Typewriter Cutting Knife

THE transparency of acrylic has led to its use in a serrated-edge form cutting knife supplied as standard equipment on a fanfold electric typewriter. The plastic knife is manufactured of Lucite by the J. E. M. Mfg. Co., Waterbury, Conn., for the Underwood Corp., New York, N. Y.

Acrylic is used for the knife in order to enable the machine's operator to read the typewritten material in the machine without having to adjust either the paper or the knife. On the earlier models, the knife was made of steel. However, the advantages of transparency were soon realized; the present acrylic knife was the result.

The knife's cutting edge is produced on a high speed router using a slow feed. The only finishing required is a buffing operation in order to obtain the desired degree of perfection. Graduations and numbers are cold stamped on the knife with a power press using a steel die.

The form cutting knife is in use on the Underwood Corp.'s new electric keyboard fanfold writing machine, which was designed to produce better and more multi-copy work with less physical work by the operator. The machine, it is stated, combines the electric keyboard for speed and uniformity of type impressions with improved automatic features for simplified machine manifolding operations.

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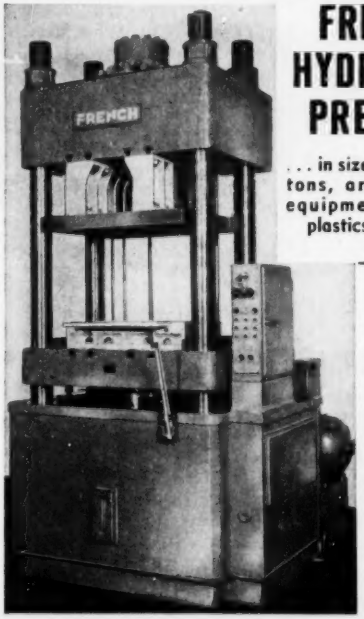

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Toothbrush Display

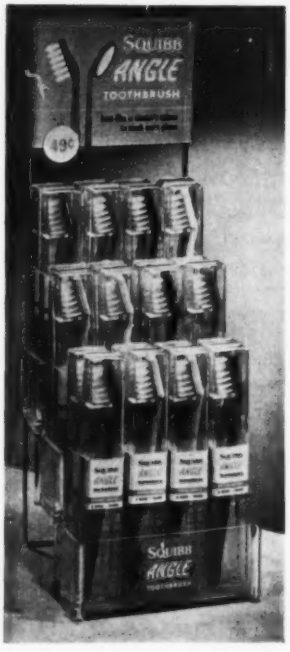
THREE transparent polystyrene trays form the main part of a toothbrush container display molded and assembled by Boonton Molding Co., Boonton, N. J., for Robert Kayton Associates, New York, N. Y. The display unit is being used to promote sales of the Angle Toothbrush made by E. R. Squibb & Sons, New York, N. Y.

The unit's plastic components consist of three racks, each of which holds eight toothbrushes. The racks are produced in a two-cavity die. The material is Styron.

The unit is assembled by pinning the three racks together and then using Parker-Kalon screws to attach them to a chrome-plated frame. The metal sign is slipped into position over the uprights of the frame.

Containers also polystyrene

The container for each toothbrush is also molded of transparent polystyrene. It is reported that the use of polystyrene for the container rather than the conventional glass has cut shipping costs. The containers and their snap-fit lids are molded in a multiple cavity die by the Celluplastic Corp., Newark, N. J. The container has a molded-in ridge to permit proper positioning of the Angle Toothbrush.



Toothbrushes packaged in individual molded polystyrene containers are displayed in rack made up of three trays molded of transparent polystyrene. The three trays are screwed to a chromium plated frame

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Plastics on the Wall

(*Continued from page* 91)

seals in the lustrous beauty of the panels and shuts out dirt, grime, grease, and moisture.

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Masonite Tempered Duolux, which is employed in the Marlite panels, is made of wood fiber produced by exploding chips with high pressure steam. In the other principal manufacturing steps, the fiber is suspended in water, washed, refined, screened, felted into sheets on a forming machine, and welded into hardboard under high temperature and pressure. It is bonded by the natural lignin of the wood; no fillers or artificial binders are added.

High pressure laminates

Well known to architects and builders for a number of years, the high pressure laminates have long since won an important position in the wall covering field. Formica Insulation Co., Cincinnati, Ohio, pioneered the use of this type material for architectural purposes in 1927. Combining phenolic, urea, and melamine resins with suitable treated papers, fabrics, wood veneers, and other materials, the high pressure laminates are cured under temperatures of approximately 300° F. and pressures of more than 1100 p.s.i., producing attractive, durable surfaces ideally suited for wall coverings, table tops, counter surfaces, and a variety of other applications.

The hard surface of these laminates requires no painting or periodic refinishing. Colors are unusually stable under the effects of ultra-violet light, while a high degree of chemical inertness prevents spotting with ordinary liquids. Many decorative effects are available, since the materials are manufactured in a wide range of colors and patterns, as well as in types incorporating actual sheets of wood veneer protected by a transparent melamine surface sheet.

This type of plastic sheet is stable in dimensions, even when subjected to considerable changes in humidity and temperature. These and other practical qualities have recommended the high pressure laminates to decorators and architects for use in many important public buildings. Stateroom bulkheads in passenger ships, wainscot and escalator paneling, kitchen and bathroom wall panels, hospital reception and operating rooms, etc., illustrate the versatility of these materials as wall coverings.

When used as wall covering materials, the high pressure laminates may be employed in either of two basic forms—as a thin sheet, to be bonded to the

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basic surface on the job, or as a pre-fabricated panel already laminated to a suitable backing of plywood, hardboard, or other material. Some of the laminators operate their own veneering departments, where the plastic sheets are attached to various cores to produce wall paneling or other pieces which are shipped ready for erection by others.

An example of the latter is Micartaboard, made by Westinghouse Electric Corp. and distributed exclusively by U. S. Plywood Corp. In this material, a thin skin of Micarta phenolic laminate is bonded under high pressure to ⅛-in. hardboard, making a plastic-faced panel 5/32 in. thick, in sizes up to 4 by 8 feet. Micartaboard is easily erected on existing plaster or other walls, producing an attractive, easily maintained installation. It is available in a large assortment of colors and patterns.

Formica is customerily supplied as a sheet 1/16 in. thick veneered to plywood with casein or resin glue. The material is also available in hardboard assemblies 5/32 in. thick or 5/16 in. thick for wall coverings, signs, etc., to be used in conjunction with molding strips which conceal all means of attachment. The edges of the sheets are nailed to wood grounds and the nailheads hidden by cover strips.

Consoweld decorative laminates, produced by the Plastics Div., Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis., also belong to this broad family of high pressure plastic materials. Colorful and decorative, they are particularly recommended for kitchen and bathroom surfaces, where their resistance to temperatures as high as 275° F., low moisture absorption and high resistance to cuts and scratches reduce wall maintenence to a minimum.

Consoweld laminates are produced from layers of high-strength paper, resin impregnated and cured under carefully regulated temperature and pressure. They are supplied in a wide range of colors and patterns in the form of standard size panels.

When used as wall wainscoting, materials of this type may be bonded satisfactorily to concrete, metals, hard wallboards, and other surfaces. For field application, adhesives of the rubber base type have been found particularly effective, since they possess initial tackiness and do not require pressure to secure a satisfactory bond. Among the adhesives of this type found acceptable for field application by one major producer of high pressure decorative laminates are Stix No. 469 (Adhesive Products Corp., New York); Tuff-Cote 109 (Goodloe E. Moore Co., Danville, Ill.); Tygobond-30 (U. S. Stoneware, Akron, Ohio), and U-Sements (U. S. Rubber Co., Mishawaka, Ind.). For shop application, adhesives usually employed are of the resorcinol, urea, casein, or rubber base variety.

Polyester laminates

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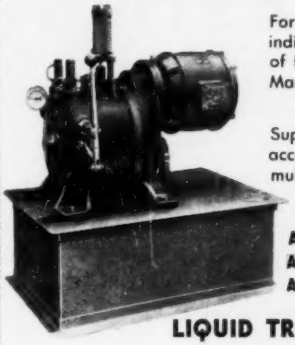

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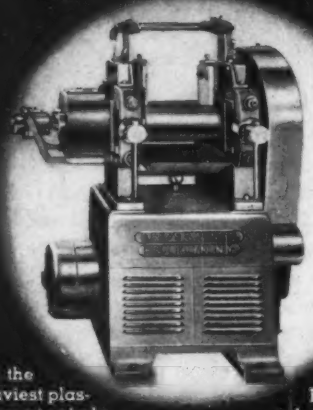

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cloth, appear to have many qualities recommending their use as wall covering materials, developments in this direction have been rather limited to date. Up to the present time, the producers of these materials have apparently focused their attention primarily on horizontal applications such as counter and table tops.

The polyester laminates offer wide color range, a broad choice of patterns, and varying degrees of flexibility to suit the end application. In their resistance to common staining agents, ease of cleaning, and many other properties, they closely parallel the high pressure laminates.

The materials are usually supplied in the form of continuous rolls and are easily cut and fitted to plywood, iron, aluminum, plaster, composition board, and other bases. The bonding process involves quick-drying, tenaciously adhering types of cements and low pressure. The specific type of cement and application process employed depend upon the nature of the job itself, the base to be covered and the time available for the installation.

Western Products, Inc., Newark, Ohio, has successfully merchandised its Westplak polyester laminate for wainscoting and sinks, as well as for counter back splashes. The material has been well received for several seasons, according to the company: 1) It is a relatively non-brittle sheet with all the chemical and wearing characteristics of a quality thermosetting polyester resin; 2) it is supplied with a specially developed mastic for on-the-job installations; 3) it is available in 12-ft. standard lengths and longer on special order; 4) it is easily cut and handled (can be scored and broken); 5) it is used with hold down moldings which insure permanent applications and add to the decorative effect.

Due to its flexibility, Westplak can be shaped to fit curved surfaces, round out dirt-catching corners, etc. It will successfully cover columns, convex, or concave surfaces. Colors available include blue linen, tan linen, yellow linen, red linen, light woodgrain, and a number of others. The standard thickness of the material is 1/16 inch.

Vinyl Film

(*Continued from page* 95)

one operation. The big roll of film from the calender is fed through from the rear of the stand, up and over an aluminum measuring drum onto the examining table. The desired yardage is cut off as it is wound around a front roll, ready for packing as bolts of yard goods or for fabrication into various products. The machine sells for around $700 and, for $200 additional, slitting rollers can be added so that different widths of material can be slit from the width of the large roll.

A similar machine has been designed for more

exacting inspection to detect pin holes in vinyl film intended for such applications as inflatable goods, baby pants, rainwear, and other items that must be air- or water-tight. When a pin hole shows up, an indicating mark is made along the edge of the material to show that there is a hole somewhere along that width of the goods, which is subsequently cut out of the roll. The operation is performed by electronic conduction—not by photo cell. The machine will handle 54-in. material of from 4 to 20 mils and sells for around $3000.

Film cutting

Cutting operations on vinyl film are quite similar to those employed on fabric. One of the most frequently used machines in the plants of larger fabricators is the cut-off reel. The principle part of the machine is a large drum set with circumferencial bars so that a circumference of anywhere from 12 to 120 in. may be obtained. With this machine it is possible to cut from 100 to 500 pieces in one-tenth the time required on the older type spreader and layout table.

The most modern cut-off reels are also equipped so that a roll of goods can be split in half (say, from 54 to 27 in.) The cutting knife is adjustable so that it can be set anywhere to get the widths desired or any number of knives can be used so that as many as 52 strips could be cut from a 54-in. roll if desired. These machines are sold for about $900.

However, the more customary way to obtain narrow widths, especially when long lengths are desired, is to use a standard slitting machine, the same as used for slitting fabric or paper. One new machine of this type is supplied with 40 slitter knives, and more can be had if desired. This machine is said to prevent burrs, fusing, and telescoping, and will cut in excess of 100 yd. per minute. On this basis, cutting costs are approximately ¼¢ per 54 in. yard, according to the manufacturer.

Die cutting of vinyl film is standard practice in the industry when curved or complex shaped figures are necessary. Some fabricators make their own dies, but a great majority are purchased from custom die houses. One-piece dies of the type widely used for cutting fabric, paper, linoleum, and leather, are generally employed. The cutting edge of hardened steel is usually beveled differently and has a sharper edge than a die used for fabric.

Steel rule dies have proved practical when used on printing or die cutting presses in runs as high as 250,000. The cutting edge for this type die extends not more than ¼ in. above the wood, and only a few thicknesses of film can be cut at one impression, but such dies are generally run in gangs to increase production speed. The film must be cut to sheet size for feeding into the press.

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clicker, dinker (sole cutting), or fabric die cutter is used. The clicker commonly used for cutting shoe uppers is generally used for steel rule-clicker dies. The die cutting edge may extend ½ in. above the wooden form so that several layers of material can be cut at each downward stroke of the striking beam. The operator moves the die around on the block by hand after each impression until the entire roll of plastic has been cut.

With one type fabric die cutter, the film is laid out on a long table in back of the machine and pulled toward the operator who manipulates a die transversely across the film. With a 7½-in. long die he can obtain three cuttings and very little waste on a 24-in. wide sheet of film. As soon as he has gone across the width of the film, the operator pulls the material forward and starts on another row of cuttings. The cutting length of these machines is 60 in.—cutting width is 24 inches.

All-steel dies can be used, of course, for these operations and are recommended for long runs. They will last indefinitely in comparison to the steel rule clicker dies which are recommended for only a few weeks steady run or for cutting samples. The difference in cost is sizeable— a steel die that would cost in the neighborhood of $50 can be approximately duplicated in steel rule or a steel rule clicker for less than $10.

In addition to these specialized cutting devices, a variety of hand-operated and hand-guided power cutters are employed for cutting to pattern.

The foregoing gives only the highlights of the methods and systems used by various fabricators in preparing vinyl film for the consumer. Some of the newer things described here will undoubtedly be outmoded a year from now. In this growing and exciting industry, in which only the alert and risk-taking mind can survive, success is based largely on the ability to grasp the importance of new developments—and to apply them.

Acknowledgments

For information concerning equipment mentioned in this and previous articles, we are indebted to:

The Singer Sewing Machine Co., New York, N. Y.; Mayflower Electronic Devices, Inc., West New York, N. J.; Progressive Machine Co., Paterson, N. J.; Columbia Slitting Machine Corp., Chicago, Ill.; Waldes Kohinoor, Inc., Long Island City, N. Y.; I. B. Kleinert Rubber Co., New York, N. Y.; Leonard M. Schur, Inc., New York, N. Y.; Plastron, Inc., New York, N. Y.; Accurate Steel Rule Die Manufacturers, New York, N. Y.; Rapid Shoe Machine Mfg. Co., New York, N. Y.; The Seltzer Fastener Co., Philadelphia, Pa.

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Autographic Method

(*Continued from page* 118)

isions, i.e., $\delta_2 = V\theta/96$. Therefore, from equation (4) it follows that:

$$\delta_2 = VS/96K \qquad (5)$$

δ_2 is the deflection of the loaded end of the test beam with respect to the fixed end of the weighing beam for a given load. δ_1, from equation (3), is the deflection of the stiff, nondeformable beam with respect to the fixed end of the weighing beam for the same load. The deflection of the test sample, therefore, with respect to its fixed end is the difference between δ_2 and δ_1, and can be written as follows:

$$\delta = S\left[\frac{V}{96K} - M_2\right] \qquad (6)$$

Therefore, from equations (2) and (6) the load-deflection ratio becomes:

$$\frac{P}{\delta} = \frac{M_1}{\left[\frac{V}{96K} - M_2\right]} \qquad (7)$$

Finally, substitution of equation (7) into (1) results in the following formula for the calculation of stiffness:

$$E' = \frac{48L^3}{I} \times \frac{M_1}{\left[\frac{V}{96K} - M_2\right]} \qquad (8)$$

M_1 and M_2 are constants of the weighing beam, V is the linear speed of the loading screw, and K is the slope of the initial portion of the curve plotted from data taken from the strain recorder chart.

In order to cover a wide range of stiffness, such as is encountered when rubberlike materials are exposed to extremes of temperature, several weighing beams are necessary. Table I lists five designed to evaluate stiffness from approximately 100 to 1,000,000 p.s.i. for specimens 1/16 to 3/16 in. thick.

For stepwise control of the rate of straining various sprocket combinations are interposed between the motor and the loading screw. Five such combinations as well as the screw speed associated with each are listed in Table II. The screw speeds given are based on a 10 RPM motor and a thread of 20 TPI, since these were used in obtaining data to be reported later.

The maximum rate of straining ($e'_{max.}$), which occurs at the surface of the fixed end of a specimen, and which is constant for a given screw speed, can be computed in terms of previously defined constants by means of the following equation:

$$e'_{max.} = \frac{3d}{2L^2}(V - 96K\,M_2) \qquad (9)$$

Representative data

Illustrative data, obtained with the use of the apparatus described above, are listed in Table III.

(*Please turn to page* 166)

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Table II.—Sprocket Combinations and Screw Speeds

Teeth in motor sprocket	*Teeth in screw sprocket*	*Screw Speed (V)*
		in./min.
44	16	1.374
44	24	0.917
16	16	0.500
24	44	0.273
16	44	0.182

A polyester resin, designated as Laminac PTS-240, and a plasticized polyvinyl chloride compound (Koroseal) were tested at intervals over a temperature range from +50 to −65° C. Specimens 0.25 in. wide and about 1.5 in. long were cut from sheets of these materials. By adjusting the weighing beams to maintain a distance of 1 in. between the sample vise and the tip of the loading-screw, L in the formula (see equation 8) was eliminated and computations thereby simplified. At temperatures above room conditions a circulating-air oven provided control; a standard thermostatically controlled test cabinet, employing dry ice as a coolant, was used at the lower temperatures. In Table III each stiffness figure reported represents an average of from three to five individual tests. Since the stiffness of these resins is known to be dependent to some extent upon the straining rate, this factor was held substantially constant at the various temperatures by suitable choice of sprocket combinations. In addition to stiffness, the weighing beam, screw speed,

Table III.—Stiffness Data for Two Plastics

Material	*Temperature*	*Stiffness (E')*	*Weighing beam*	*Screw speed (V)*	*Strain rate (e')*
	° C.	*p.s.i.*		*in./min.*	*10^{-5} in./in./min.*
Laminac resin PTS-240	55	920	B	0.182	1.3
	45	1,900	B	0.182	1.0
	35	5,700	B	0.500	1.3
	25	11,000	B	0.500	0.8
	15	21,300	B	0.917	0.8
	5	36,000	C	0.500	1.1
	−5	56,000	D	0.273	1.2
	−15	86,000	D	0.273	0.9
	−25	150,000	D	0.500	1.1
	−35	220,000	D	0.500	0.8
	−45	320,000	E	0.182	1.0
	−55	430,000	E	0.182	0.8
	−65	530,000	E	0.273	1.1
Koroseal resin	25	1,300	A	0.182	1.2
	10	6,700	B	0.500	1.1
	5	14,000	C	0.273	1.2
	0	42,000	D	0.273	1.2
	−5	110,000	D	0.500	1.3
	−20	300,000	E	0.182	0.9
	−35	500,000	E	0.273	0.7
	−50	500,000	E	0.500	1.5

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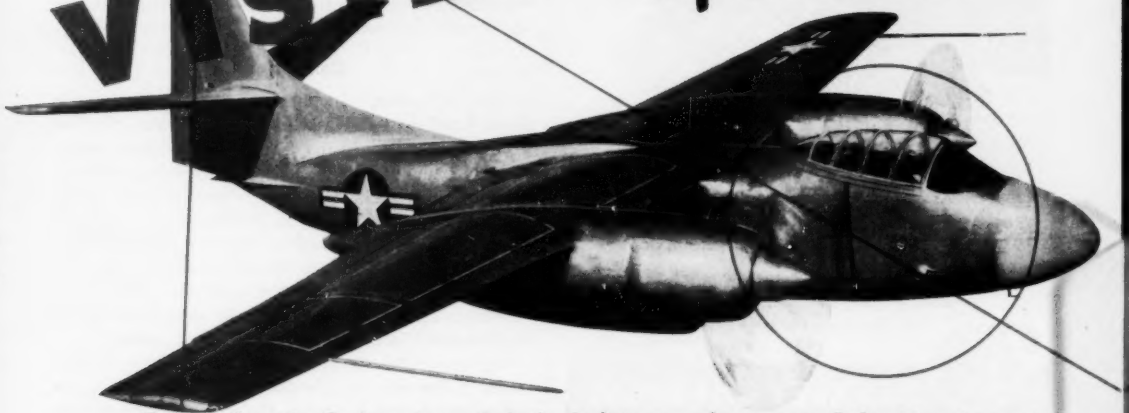

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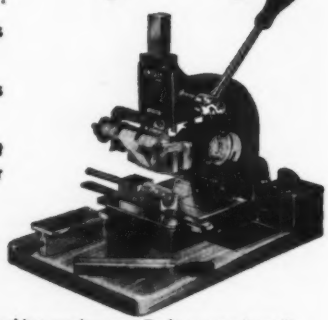

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and straining rate associated with each result are indicated in the table. In order to bring out the contrasting behavior of the two materials, the logarithm of stiffness is plotted versus temperature in Fig. 3. The Koroseal sample exhibits the S-shaped curve characteristic of materials in which flexibility has been achieved by the addition of diluent plasticizers. Typical behavior of molecularly homogeneous plastics is illustrated by the non-inflected curve of the polyester resin (PTS-240).

Conclusions

The equipment and procedure described have been found especially useful in the laboratory for the evaluation of new resins during development stages. The instrument, aside from the recorder, was assembled in a short time and at little cost. In addition to the sensitivity and convenience it affords through the use of autographic recording, the fact that rate of straining can be held nearly constant at a desired value further guarantees the merit of the method. This contrasts with the general lack of such control in the present A.S.T.M. method.[4]

No particular significance is attached to the results of the tests on the two resins. These data are intended only to illustrate the scope of the equipment.

Lignin Concentrates

(*Continued from page* 119)

process.[6] Lignins recovered from pulp mill waste liquors have been used to some extent in commercial production of plastics, particularly in laminated and structural board products. These lignins when compounded as phenolic molding materials, have generally given rise to molded products which were brittle and deficient in strength but very resistant to water absorption. Thus, even though saccharification lignins are essentially inert, it seemed important to evaluate the concentrate byproduct of continuous saccharification. Studies were made, therefore, on lignin concentrate prepared from corncobs by the Northern Laboratory process as a component in phenolic plastics.

The lignin concentrate

The lignin concentrate for this study was prepared from red corncobs in accordance with the method of Dunning and Lathrop.[3] The acidity of the concentrate was reduced by leaching with water at 190° F. until the pH value of the mass was greater than 3.5. The leached concentrate was dried at 140° F. and then ground in a rotary chopping mill to break up the agglomerates. Results of chemical

[6] "Testing of Plastics from Scholler Lignin," by R. D. Englert and L. Friedman, Pacific Plastics 3, 38 (Oct. 1945).

analyses of this material are presented in Table I. Unless otherwise stated, analyses were made in accordance with TAPPI Standards.[7]

As a component and filler

It is generally recognized that lignins isolated by acid hydrolysis, and this includes saccharification processes, are essentially inert materials. It was deemed advisable, therefore, to attempt activation of this lignin concentrate from corncobs. Solubility of the concentrate in some organic solvents was improved markedly by treatments of the concentrate up to 375° F. with phenols in the presence of small amounts of reagents having acidic reactions. However, the treated concentrate when used as a component of phenolic resins, aside from promoting water resistance in molding compounds, appeared to behave essentially as an inert filler.

The inert character of this lignin concentrate suggested that it might be used more appropriately as a filler in thermosetting phenolics. Consequently, compounds containing equal amounts of the concentrate and a variety of experimental and commercial resins were prepared and tested by conventional methods. These tests showed that although the final molded products were of good appearance, they were relatively brittle and weak in strength properties. For example, they gave flexural values of 7000 p.s.i. in comparison with a minimum specification of 9000 p.s.i. for general purpose phenolics. These results are similar to the results obtained by other investigators using lignin obtained by the modified Scholler process[8] and a lignin concentrate produced by the partial acid hydrolysis of wood.[8]

Outstanding among the properties of the molded compounds, however, was the resistance to absorption in boiling water (method of Clark, Williamson, and Lathrop).[9] This property imparted by the lignin concentrate might make its use possible in conjunction with other fillers in compounds for which improved resistance to water absorption is required. The effect is readily illustrated by the following data for compounds containing 25% of a phenolic resin: 22.5% calcium carbonate (precipitated chalk), 0.5% zinc stearate, 2.0% black dye, and lignin concentrate and corn cob flour as indicated.

Concentrate content	*Corncob flour content*	*Hot-water absorption*
%	%	%
0	50	2.54
25	25	1.52
50	0	0.56

While the above data were obtained with compounds of reduced resin content, similar results are obtained with compounds of higher resin content.

[7] "TAPPI Standards." New York: Technical Association of the Pulp and Paper Industry.
[8] "Plastics from Hydrolyzed Lignocellulose," by R. Katzen, A. O. Reynolds, and D. F. Othmer, Modern Plastics 20, 91 (Oct. 1942).
[9] "Agricultural Residues in Plastics. Part I. Agricultural Residue Flours," by T. F. Clark, R. V. Williamson, and E. C. Lathrop, Modern Plastics 23, 158 (Oct. 1945).

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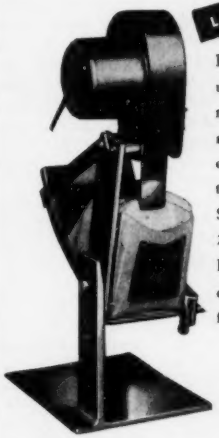

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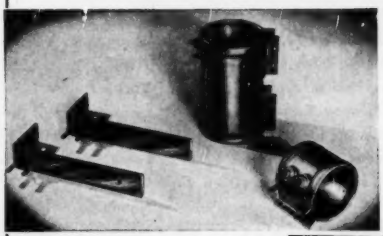

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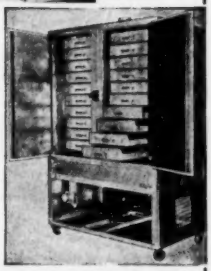

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INTERPRETATIONS OF THE CURRENT NEWS

By R. L. VAN BOSKIRK

Rogers Board

A NEW group of thermosetting phenolic molding compounds under the name of Luron and the addition of laminated phenolic stock to its list of plastics materials have been announced by the Rogers Corp., which has plants in Manchester and Goodyear, Conn. These new developments coincide with Rogers' taking over the marketing of Rogers Boards and Moldice, following termination of a toll agreement under which Bakelite Corp. had handled the sale of these latter products.

Simultaneously, the company is extending its plastics fabricating services to include: 1) supplying parts made from laminates according to customer or NEMA specifications and 2) supplying pre-shaped preforms.

*Reg. U. S. Patent Office.

The sheet materials made by Rogers are produced by the wet machine beater process. In this method, cellulose and other fibers are blended with phenolic resins in the beater, then sheeted on a wet cylinder machine to the desired thickness. The material is said to have greater flexural strength than dry filled phenolic fabric or flock materials.

Rogers Boards and Moldice were developed to provide industry with materials combining moldability and superior shock resistance. Three types of boards are produced: the first of these is a molding board available in seven different standard grades which vary in their high impact strength, flexural strength, finish, and moldability. Blanks can be die-cut to the size, shape, and weight of the finished piece, ready to be dropped into the mold. Typical uses for Rogers molding boards and blanks include reinforcing strips for telephone handsets, refrigerator latch bolts, motor housings, knife handles, instrument cases, and numerous other applications where high shock resistance is required.

The other types are those produced in single sheets according to the thickness specified for electrical and punching stock and one for printing matrices and embossing. The latter can be used for making rubber or thermoplastic printing plates or for embossing leather and thermoplastic sheet.

Moldice, which is made in four standard grades, is diced Rogers Board. They are medium-high impact products with a low bulk factor. They can be preformed on automatic equipment and used in the same molds designed for general purpose phenolics.

The new Luron phenolic molding compounds are companion materials to Moldice but are lower priced. Luron, although new, is already in use on such applications as transformer housings, industrial tote boxes, and electrical units, including heavy-duty light sockets, outlet boxes, toy train remote control switches, and conduit end bushings.

Luron differs from Moldice in that it is originally produced in particle form rather than being run in sheets and cut or diced at some later time.

The company also boasts an experimental machine whereby a run of new material with only 25 lb. of ingredients may be tested to determine the practicality of a formulation from a commercial standpoint.

National Plastics Exposition

The next National Plastics Exposition will be held March 28, 29, 30, and 31, 1950, at the Navy Pier, Chicigo, Ill., it has been announced by Dale Amos, chairman of the Fourth National Plastics Exposition Committee, and general manager of Amos Molded Plastics Co., Edinburg, Ind. It will be restricted to the trade only.

Serving with Mr. Amos on the committee are the following: Richard M. Lamport, assistant vice-president, General American Transportation Corp., Chicago, Ill.; Charles E. Elmes, vice-president, American Steel Foundries, Chicago; Michael A. Brown, Jr., sales promotion manager, Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo, Ohio; P. H. Grunnagle, Westinghouse Electric Corp., Pittsburgh, Pa.; David S. Hopping, director of sales, Transparent Films Dept., Celanese Corp. of America, New York, N. Y.; W. C. Conroy, sales manager, Plastics Div., Erie Resistor Corp., Erie, Pa.; Dennis C. Guthrie, Tennessee Eastman Corp., New York; James R. Turnbull, general manager sales, Monsanto Chemical Co., Springfield, Mass.; Donald G. Fertman, advertising manager, Plastics Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Todd Harris, sales manager, Creative Plastics Corp., Brooklyn, N. Y.; Russ Matthews, Bakelite Corp., New York; C. C. Campbell, Rohm and Haas Co., Philadelphia, Pa.; and W. T. Cruse, executive vice-president, Society of the Plastics Industry.

Drawings for booth space will be held on Tuesday, Oct. 4, 1949, beginning at 10 a. m. at the Hotel Commodore, New York, when interested exhibitors will gather for the official drawing from the "gold fish bowl."

New methacrylate producer

A NEW plant for the manufacture of commercial quantities of methacrylate compounds has been recently opened by the U. S. Plastic Products Corp., Metuchen, N. J. The products include methyl methacrylate and methacrylic acid monomers, from which can be produced sheets, molding powders, emulsions, and other products similar to those produced from other types of acrylics.

It is reported that the company is merchandising its monomer at a lower cost than similar materials now available. Although polymers of these materials are not now pro-

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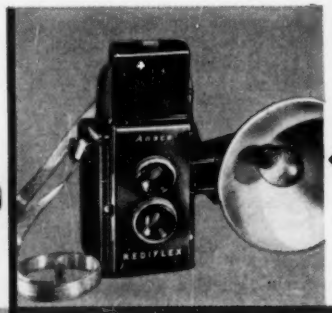

The good physical characteristics of Styron 683, combined with ease of molding, and the plus value of improved heat resistance indicated its use for the Ansco Rediflex Camera Case molded by Ansco, Division of General Aniline & Film Corporation, Binghamton, New York.

Styron 666 in the Curtiss Candy Dispenser by Plastics Manufacturing Company, 825 Trunk Ave., Dallas 10, Texas and Styron 411C in the Utility Tray by Columbus Plastic Products, Inc., 1625 W. Mound St., Columbus, Ohio, were used for their physical strength, high clarity and molding performance that leads to quality and economy in the product.

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For general purpose molding, Styron 411C, 666 and 683 offer a broad range of outstanding physical characteristics including good fabrication performance and ease of molding, remarkable clarity and improved heat resistance —properties that give you wider design freedom, meet your varied job specifications, increase production runs and lower your over-all job costs.

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Plastics

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duced in commercial quantity by the U. S. Plastic Products Corp., it is anticipated that polymerization equipment will be installed later this year. The company has been in production since mid-April.

Dr. Rowland Burnstan is president of the organization, and Samuel Brass, treasurer.

Vinyl ethers

A PRICE reduction in tank car lots of vinyl alkyl ethers has been announced by General Aniline and Film Corp., 230 Park Ave., New York 17, N. Y. Vinyl methyl, ethyl, iso-butyl, and n-butyl ethers (Technical), used to achieve internal plasticization by copolymerization with other monomers, such as vinyl chloride and acrylonitrile, are now available at 27¢ per lb., f.o.b. Grasselli, N. J., as against former prices of 42¢ to 53¢ a pound.

These comparatively new low-priced chemicals are characterized by their versatility and ability to polymerize and copolymerize with other materials and by their unusual chemical reactivity.

Inquiries are invited regarding the ethers currently available, as well as other vinyl alkyl ethers which might be desired for research and development purposes. Information, samples, and price schedules may be obtained from General Aniline and Film Corp., Central Sales Development Dept., 22 Center Square, Easton, Pa.

Electrical laminate

CUSTOMERS of C. E. White, Bulkley Bldg., Cleveland, Ohio, sales agent for parts and other supplies used by electrical manufacturers, are reported to be showing a great deal of interest in Tensilite 300, a comparatively new laminate manufactured by the J. P. Lewis Co., Beaver Falls, N. Y. This material was discussed in the Plastiscope, page 192, December 1948. It is a laminate made from ground hard wood fibers which are steamed, treated with resin in the beater, then run over a paper machine and into a dip tank containing a water-soluble phenolic varnish.

Mr. White reports that the electrical properties of Tensilite 300 are as good as those of many of the regular grades of phenolic laminates, and the price range of from 25 to 40¢ a lb. is attractive.

The laminate is comparable with grades X, P, and XX of the regular industrial laminates and is primarily applicable to such things as terminal strips and tube sockets in radios, switch parts for automotive and household use, or where high temperature resistance is not necessary.

Fluorescent lamp shields

A NEW line of commercial type fluorescent lighting fixtures has been announced by Sylvania Electric Products, Inc., 500 Fifth Ave., New York, N. Y., which includes a polystyrene shielded lamp designated as CP-447, particularly suited to the more intimate type of stores, executive offices, and conference rooms, where well diffused, virtually shadowless light is preferred.

The shielding assembly may be lowered from either side for relamping or completely removed for cleaning without use of tools.

Wide acetate sheets

PRODUCTION of Vuepak and Fibestos cellulose acetate sheets in a new width of 60 in. has been announced by Monsanto Chemical Co.'s Plastics Div. The new width is available at no increase in price.

Vuepak and Fibestos sheets are now available in widths of 20, 30, 40, and 60 inches. They have found wide use for packaging and protective coverings for store windows.

Seat cover trim

GREATLY improved cold resistance of its all-plastic upholstery material is claimed by the Textileather Corp., Toledo, Ohio, since the development of a new method of compounding. Called Sturdifilm, the material is an unsupported vinyl resin sheet which will not shatter at low temperatures, according to Textileather, and is recommended for automobile seat cover trim.

Iridescent plastics

IRILITE, a new material which amalgamates a derivative of sea shells with vinyl compounds, acrylic, glass fiber, melamine fabrics, or paper, has been placed on the market by Richelieu Corp., 389 Fifth Ave., New York, N. Y. The material gives an iridescence to plastics or fabrics, providing a decorative approach not duplicated by previous materials, according to company spokesmen. The shells are first treated in a chemical process which produces iridescent flake particles of a pearl-like quality.

The company is exhibiting numerous furniture pieces, lamps, household accessories, appliances, and decorative items which can be made with the Irilite material.

Norwegian plastics show

THE Norwegian Industries Development Assn. in cooperation with the Norwegian Plastics Federation has announced an international plastics exposition to be held in Oslo, Sept. 19 to 30.

The exposition is intended to point up the important role of plastics in modern industry to convince government authorities of the necessity of granting sufficient currency license for import. Consequently, there will be no display of the customary finished molded articles; the displayed material will consist of the different types of all the raw materials, and the different intermediate products, which in one way or another form a basis for further industrial production of refining.

Finished articles will be displayed only when they demonstrate uses of new raw materials or new applications. Finished articles will also be shown to represent the more advanced molding, extruding, shaping, or welding techniques. Plastics machinery and testing equipment will be a part of the display.

Any interested parties may contact the Norwegian Industries Development Assn., Oslo, Norway, or their Norwegian representatives, for further information.

Another latex

IDENTIFIED as Vinylite dispersion resin NV.4, a new grade of resin has been announced by the Bakelite Corp., 30 E. 42nd St., New York 17, N. Y. It is quite similar to the company's VYNV and VYDR grades that are used in preparing organosol and plastisol dispersions and solution coatings. It differs from most other latex type resins in that it is furnished in dry form from which stable water dispersions can be prepared as required.

The new resin can be mixed with plasticizer and dispersed in a pebble

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mill or, in some cases, on a three-roller mill, and the resulting water dispersions exhibit unusual stability to mechanical agitation, freezing, electrolyte contamination, and to changes upon aging, according to the producer.

Any sediment forming can be readily redispersed, and even dried-out material can be reclaimed without undue trouble. Pigments, fillers, and stabilizers can be incorporated as desired, and the dispersions can be handled on conventional types of coating equipment. Fusing temperatures in the order of 300 to 325° F. give optimum properties, and even 250° F. bakes are adequate for many applications.

The resin is recommended particularly for coating paper, cloth, and for various materials to be used as floor coverings.

Polyester price reduction

PRICE reduction on its polyester resins sold under the trade name Laminac has been announced by the American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. The reduction covers seven different products in the Laminac series and ranges from 1½¢ to 3¢ per lb., depending upon the product and quantity purchased. Prior to this change, lowest prices were based on carload lots of 60 drums or more, but the minimum quantity to obtain lowest price is now 40 drums. At this quantity, most Laminac resins are now selling for 36½¢ to 38½¢ per pound.

Another polyethylene film producer

FLAT polyethylene film in thicknesses from 0.0015 to 0.060 in. and widths up to 60 in. is now being produced and stocked by the Durethene Corp., 55th Ave. at 19th St., Chicago 50, Ill. The company announces that tubular film, both flat and gussetted, is available in widths up to 54 in. and in thicknesses of 0.0015 in. and up.

Company reports state that the film is quality controlled to prevent variation in thicknesses. Electronic gaging equipment automatically measures the thickness of the film as it comes from the machine.

Natural and standard colors, embossed surface patterns, and designs to customer specification are available. The material can be furnished in slit rolls wound on cores with uniform tension.

Advertising awards

HONORS at the recent meeting of the National Industrial Advertisers Assn. held in Buffalo, N. Y., were won by both the Koppers Co., Inc., and American Cyanamid Co.

Koppers Co. was one of the two joint winners of the Putman Award, which is probably one of the most strived-for awards given to industrial advertisers. It is presented through the NIAA by the Putman Publishing Co. and amounts to $2000 each year. This year the judges found it so difficult to choose between the final winner, which was the Lyon Metal Products Co., and the entry of Koppers that when the final award was made to Lyon, the judges decided that the Koppers entry should receive an honorable mention certificate.

The award is based upon a complete advertising campaign, together with documented evidence of results, and was given Koppers on its Polystyrene 8 advertising. More than 25% of this advertising appeared in MODERN PLASTICS. The certificate states the award is: "For the best use of industrial advertising and the best documentation of such use in making more effective the selling of products to industry for the year 1949."

The American Cyanamid Co. received an award in the Panels Competition for its plastics campaign which was designed to stimulate new uses for plastics materials of its manufacture. Its advertising appeared in MODERN PLASTICS and several other publications.

Carbon blacks

REASONS why such a variety of carbon blacks are used in the plastics industry are pointed out by Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. This company stresses the particular advantage of having a specific type of carbon black for each use. For example, Carbolac 2 is particularly applicable to polyethylene because of its very small particle size; but Supercarbovar is a high-strength color black slightly less jet than Carbolac 2. It has proved to be outstanding for maximum jetness at minimum pigment content for vinyls. It is the darkest grade which can be completely dispersed.

Another type, Monarch 71, is applicable to vinyls where economy with good jetness is more important than the extreme black of Supercarbovar. And there are still other grades which are less costly but suitable in many applications. One, for instance, is in standard use for phonograph records.

There is a still lower-cost furnace black called Sterling R which can be used in plastics as a filler and extender as well as for color; it is often blended with stronger blacks.

Foamed plastic

ANOTHER use for modified alkyd resin is Pittsburgh Plate Glass Co.'s disocyanate foamed material. It is composed of two alkyds and isocyanate. When all three are put together and water added, the material foams in place. It has been used in radomes where it is poured between the inner and outer shell and foams up to fill the cavity. The materials must not be mixed until ready to pour into the form. The foamed material has particularly good electrical properties.

Cove base

DEVELOPMENT of a wall base cove molding to accompany its Plastile plastic flooring has been announced by The U. S. Stoneware Co., Akron, Ohio. The cove base is produced from Tygon, U. S. Stoneware's vinyl compound. It can be installed in or around corners, eliminating the use of pre-molded corners. The cove base is 4 in. high and ⅛ in. thick, and comes in 4 ft. lengths in seven solid colors.

Dye for thermoplastics

RECOMMENDED primarily for coloring thermoplastics in the mass, Resoform Green 4BL Pure is described in a recent circular by the General Dyestuff Corp., 435 Hudson St., New York 14, N. Y. In some cases the coloring agent may also be used for surface dyeing of thermoplastics and in the form of lacquer emulsions. It is insoluble in water but readily soluble in aromatic hydrocarbons such as benzene, toluene, xylene, and turpentine. Its solubility in most of the commonly used organic monomers and poly-

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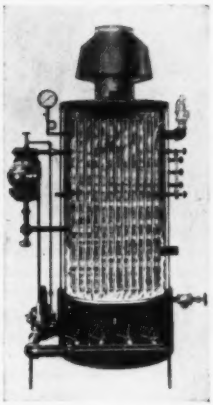

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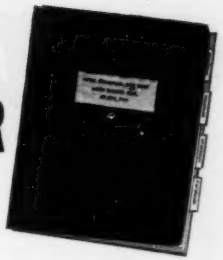
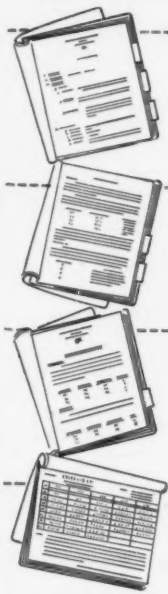


New *Ferro* Book Contains Predetermined Test Data to Simplify Your Stabilizer Formulations!

This *36-page* book of charts, test methods and performance data is available, at no cost, to all plastic manufacturers with stabilization problems in processing vinyl stocks. Compiled by the *Ferro Chemical Laboratories*, it has been issued to help your work with stabilizers under as many conditions and applications as is possible within practical limits. A brief outline of the contents follows:



PRODUCT DATA—Section one of this book contains a listing of the complete *Ferro* line of stabilizers. The chemical nature of each is explained, plus all physical properties. Each stabilizer is identified completely by product, number and type for quick, easy reference.

TEST METHODS—A complete description of test procedures in general use, along with a detailed preparation of test samples, will be found in this section for calendered stocks and plastisols.

FERRO INDIVIDUAL PERFORMANCE DATA—Each *Ferro Stabilizer* has been separately tested and is identified as to its heat and light stabilization ratings. Calendered resin and plastisol stability test data is included.

GENERAL PERFORMANCE DATA—A discussion of the various ways in which vinyls decompose, listing curves of color gain versus time, etc., is covered in this section. Also, the synergistic effect of *Ferro Stabilizers* used in combinations is included.

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mers, especially in thermoplastics, is moderate to good. However, inasmuch as it tends to crystalize pronouncedly, it is not recommended for use in concentrations approaching over-saturation. Its high resistance to heat renders it suitable for injection molding, and it has found wide use in polystyrene, cellulose acetate, methyl methacrylate, and polyvinyl chloride. In general, it produces bright bluish green transparent shades of good to very good fastness to light and heat.

Liquid plastic

RECENTLY announced by Ralph Travers, chemist of Boston, Mass., is Glasy-Cast, a new polyester liquid casting plastic described as an unusually stable casting resin and the "nearest to water-white in color of any plastic known." Mr. Travers recommends it as an inexpensive means for a manufacturer to make up several hundred samples for market and performance testing purposes before going to the expense of making steel molds. For this work, molds are made of a new molding compound called Elasto-Mold.

Laboratory tests show the physical properties of the new liquid plastic to be as follows: Color, clear and water-white; modulus of elasticity, (p.s.i.) 532,500; shrinkage in curing, 7 to 8%; hardness, (Barcol) 45-50; excellent insulating electrical properties.

Detailed information and samples of both materials may be had by writing Plastic Service, Dept. M.P., 294 Washington St., Boston 8, Mass.

Paraformaldehyde for plastics

THE possibility of using more paraformaldehyde in the plastics industry and by other industrial consumers has been suggested by the announcement of the Celanese Corp. of America that it has developed a new process for large-scale production of low-priced paraformaldehyde in flake form.

Of the 624,000,000 lb. of formaldehyde produced in 1948, about 88% was consumed by the phenol, urea, and melamine plastics industries in the manufacture of various types of thermosetting resins.

Paraformaldehyde is essentially formaldehyde in a polymerized form, with the difference that it contains less than 10% water as against 63% water in commercial formaldehyde solutions. Up to now there has been a limited market for paraformaldehyde because of a wide price differential between it and straight formaldehyde. Conventional paraformaldehyde sells at around 24¢ per lb., f.o.b. The new Celanese chemical, produced at the corporation's plant at Bishop, Texas, sells for 11¢ a lb., f.o.b. plant.

Although the new chemical is being produced initially as flake, indications are that it will soon be made available in other forms for special applications.

Testing machine

RECENTLY installed in the main laboratories of the United States Testing Co., Inc., at Hoboken, N. J., is a new type Universal Testing Machine incorporating the unusual features of full load capacities from 2 to 5000 lb., with a sensitivity of 0.002 to 5.0 lb. at the extreme range and having a guaranteed accuracy of 0.2% or better for any load range. The company advises that the machine is designed to make tension, compression, and transverse tests on all types of materials—textiles, plastics, rubber, fibers, or filaments, etc.

The testing company has also announced the following additions to its staff: Frederick L. Fish, formerly with the Masonite Corp. and the New York State Government, assigned as service representative assisting plastics firms in the development of testing and research programs; Michael Powsner, formerly with the Office of the Quartermaster General, Washington, D. C., now assistant supervisor in the recently formed Engineering Inspection Div.; and Edward H. Winkleman, formerly with Morrison-Knudsen Afghanistan and the Rockefeller Center Corp., now working on the application of ultrasonics to industrial problems.

Plasticizer for urea adhesives

INCORPORATION of about 2% Diglycol Stearate S in urea-formaldehyde adhesives for plywood veneer board to plasticize the adhesives to prevent them from becoming brittle after setting, is recommended by Glyco Products Co., Inc., Brooklyn, N. Y., and Natrium, W. Va., which manufactures the Stearate product. Bonding action is reported as not affected by the use of the plasticizing material, which is a white, waxlike product having a slight agreeable fatty odor.

South American plastics

FIRST firm reported to be producing film and sheeting in South America has recently been set up in Rio de Janeiro, Brazil. The firm, Vulcan, S. A., is a subsidiary of Companhia Nacional de Tecidos Nova America, a South American textile company currently engaged in manufacturing cotton goods. In addition to calendering vinyl film and sheeting in thicknesses ranging from 0.004 to 0.012 in., the organization prints and embosses the film. Production began in June, 1949.

Another firm, Bakol, S. A., in Sao Paulo, Brazil, began production of polystyrene molding material in July, 1949. These two plants are reportedly the only ones of their kind presently operating in South America.

Bakelite Corp., 30 E. 42nd St., New York 17, N. Y., is cooperating with these two recently organized Brazilian firms by making available its experience to further the plastics industry in South America.

Color concentrates for molding

AVAILABILITY of Unicolor master color batches especially compounded for coloring thermoplastic materials for injection molding has been announced by Westchester Plastics Co., Mamaroneck, N. Y. Heretofore, these concentrates, which are pigment concentrations dispersed in a resin-plasticizer base, have been used to color extrusion compounds only.

Molders who have experimented with the material report uniform color without streaks or mottles. The standard mixing ratio for injection molding is 1 part Unicolor to 6 parts uncolored material.

The company will send working samples to interested molders.

COMPANY NEWS

Wright Manufacturing Co., Houston, Texas (formerly Taylor Manufacturing Corp. before moving from Wisconsin to Texas), has begun operations in its new $2,000,000 plant for the manufacture of proprietary

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and custom molded plastics. Eighteen presses are in use in what is said to be one of the most modern plants in the industry. It is under the supervision of **Carl Eckenrod**, who has been with the Wright Co.'s plastics and molded rubber division for seven years.

Among the firm's proprietary items are dishware for institutions, including trays, dishes, cups, saucers, glasses, and bowls. Many other items are reported to be under design for use by the oil industry.

Under the plastics and molded rubber division are also produced football cleats, rubber mallets, rubber mats, Wrightex and Wrightflor rubber tile, etc.

M. Lowenstein and Sons, Inc., has announced formation of a new division, **Eddifilm Plastics**, with headquarters at 37-45 Leonard St., New York 13, N. Y. The division will specialize in the conversion of plastics for the manufacturing, wholesaling, mail order, and chain store trades, featuring vinyl film for plains and prints in various widths. It is headed by **Allyn J. Weinstock**, assistant vice-president of M. Lowenstein and Sons and merchandise head of the Eddington Drapery Div., with **Frederick J. Feitler** as sales manager.

Rogers Plastics Corp., North Wilbraham, Mass., has moved its entire plant to West Warren, Mass., about 12 miles east of its former site. **Arnold C. Martinelli**, president, says that his concern has leased two floors of 18,000 sq. ft. on each floor, and will add about 30 more employees. Martinelli, who asserts that he sold the first order of polystyrene powder for Monsanto, assumed full charge of the Rogers plant in December 1947.

Ferro Chemical Corp., Bedford, Ohio, has appointed Joe Copps as sales agent for the State of Wisconsin, with offices at 3523 W. Silver Spring Dr., Milwaukee. Immediate shipments from Chicago stocks of the company's metallic soaps, driers, fungicides, and stabilizers are available.

Cleveland Container Co., 6201 Barberton Ave., Cleveland, Ohio, has sold its entire plastics division, located in Plymouth, Wis., to **The Plymouth Co.**, Plymouth, manufacturers of aluminum and wood work advertising displays. The Plymouth Co. has retained the five buildings in which the plastics division is located and has sold the entire molding business and much of the equipment to **Plymouth Industrial Products Co.**, which has been newly formed by A. J. Simmons, former manager of the plastics division of Cleveland Container.

The new Industrial Products concern will retain the personnel of the former plastics division and will continue the manufacture and marketing of many of the same products. These include custom molded articles for **Line Materials Co.**, as well as sewer pipe fittings, insulators, battery ends, telephone and telegraph insulators, lamp bases, young tree protectors, and a variety of other items.

The Cleveland Container Co. plans to concentrate its operations in its own field of paper cans and tubes according to reports.

Tietz and Baur Plastics, Inc., has announced the opening of its plastic molding plant at Lake and Roy Sts., Melrose Park, Ill.

Lentex Plastic Corp., distributor of Resproid plastics, produced by **Respro, Inc.**, has moved its offices from 95 Madison Ave., to 11 W. 32nd St., New York, N. Y.

Thomas Manufacturing Corp., 80 Clinton St., Newark 5, N. J., whose distributor is **B. H. Shapiro and Co.** (formerly Acme Plastic Toys), has announced that its Acme molded toys may now be obtained directly from Thomas as well as through the Shapiro Co.

Philmont Manufacturing Co., Englewood, N. J., has announced a new line of electronically welded seamed plastic products, the first of which are mattress covers and pillow cases for the hospital field.

Sillcocks-Miller Co., Maplewood, N. J., has appointed **Herbert A. Latta** as sales executive in charge of its enlarged sales program and **Farnsworth Chapin** as director of the sales service department. Mr. Latta was formerly with **Catalin Corp. of America** and Mr. Chapin was sales manager of **Plastics Manufacturing, Inc.**

Owens-Corning Fiberglas Corp., Toledo, Ohio, has recently started operations at its new $7,000,000 plant in Santa Clara, Calif. The plant is now turning out Fiberglas building and industrial insulation materials. This is the seventh plant operated by Owens-Corning Fiberglas in the United States.

Plastic Film Products Corp. has opened its third plant at 60 S. Seiberling St., Akron, Ohio. It will also maintain its plant and general offices at 70 W. Exchange St., Akron. **Frazier Manufacturing Co.**, the firm's factory at Marion, Ohio, is being expanded by doubling present floor space.

Officers of the corporation, which fabricates plastic curtains, drapes, table covers, aprons, and other household and novelty soft plastic items under the Forecast label, are **David W. Barbour**, president; **Mortimer Atleson**, vice-president; **Clair E. Stilwell**, secretary-treasurer; **William E. Myers**, vice-president.

John C. Graf Co., designers and builders of air, hydraulic, and special machinery, has moved to larger quarters at 1505 Race St., Philadelphia 2, Pa. **John R. Graf**, son of the founder, has joined the firm as chief engineer.

Electronic Engineering Corp., 624 Ridge Road, Lyndhurst, N. J., has announced the election of **P. J. Cudone** as president. The company manufactures high frequency induction and dielectric heating equipment and was formerly known as **Industrial Development Laboratories.**

General American Transportation Corp., 135 S. LaSalle St., Chicago, Ill., featured its plastics molding operations as a part of its exhibit at the Chicago Railroad Fair this year. The exhibit included samples of the company's aluminum tank and refrigerator cars, which are part of the 55,000 railroad cars it has built and operated, as well as gas-holders and other structures for the conservation of volatile vapors.

Newark Paper Box Co., 216-228 High St. at Orange, Newark 2, N. J., has purchased the entire production facilities of the See-Thru Div. of **George V. Clark Co., Inc.**, Astoria, N. Y., manufacturer of rigid trans-

molded of Ink-Resistant

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The Parker Pen Company chose PLEXENE M for its new "21" Pen because PLEXENE molds and machines so readily into light, strong, *enduring* products. Pretests in Parker laboratories proved PLEXENE resistant to ink and breakage. And further intensive testing established PLEXENE's superior dimensional stability, low water absorption, surface hardness, and unusual heat resistance (important in pens because of high heat in display windows).

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parent set-up boxes. The new acquisition will provide facilities for production of a variety of combination packages utilizing cardboard, acetate, and metal. **Richard M. Monahon,** vice-president in charge of sales and advertising for George V. Clark Co. since 1946, has joined Newark Paper Box as director of acetate sales.

Monsanto Chemical Co. has appointed **Carl T. King,** production manager of its Plastics Div. in St. Louis, Mo., as assistant to the general manager of the division. Mr. King has been with Monsanto since 1925, and in his new capacity will assume additional responsibility for the coordination of the division's foreign interests. Succeeding Mr. King as production manager is **Robert K. Mueller,** former assistant production manager.

Peerless Roll Leaf Co., Inc., has moved its Cambridge office to 238 Main St., Cambridge 42, Mass.

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has announced the appointments to its research staff at its Stamford Research Laboratories of **Gerald Johnson, G. Sidney Sprague,** and **Louis Quin. Elwood Murray, Samuel Crecelius,** and **John F. Davis** have joined the Surface Coatings Group. **Dr. John J. Padbury** has been named group leader of the Polymers and Resins Group.

Also announced were the appointments to the New Product Development Dept. of the company of **Vincent V. Lindgren** and **B. R. Putnam, Jr.**

Glass Fibers, Inc., Waterville, Ohio, has appointed **F. J. Solon, Jr.** as director of advertising and public relations, and **R. W. Capaul** as general sales manager.

Enjay Co., Inc., 15 W. 51st St., New York 19, N. Y., has opened a rubbers and plastics sales office in the Albender Bldg., 1143 Jersey St., Elizabeth 4, N. J. **E. N. Cunningham,** who has been supervising the sale of Paracril Buna-N type rubber, has been placed in charge of the metropolitan territory for all rubbers and plastics, which include Paracril, Vistanex polyisobutylene, S-Polymer thermoplastic resin, and Deenax antioxidant. Mr. Cunningham, who will have his headquarters at the Elizabeth location, replaces **R. M. Howlett** who has moved to the Midwest territory with headquarters in Chicago, Ill.

PERSONAL

Games Slayter, vice-president and research director of **Owens-Corning Fiberglas Corp.,** was given the honorary Doctor of Engineering degree by Purdue University last month and was cited as "a creative scientist and distinguished research engineer from whose talents and vision have come new enterprises advancing our industrial economy." Mr. Slayter, who directs the **Fiberglas Research Laboratories** in Newark, Ohio, was a 1921 Purdue graduate. He has been vice-president and research director of Owens-Corning Fiberglas Corp. since that company was founded in 1938.

Frank J. Nussbaum, founder and president of the **Blue River Plastics Manufacturing Corp.** and **Durable Formed Products,** has resigned from these firms and joined the **Scheidl Manufacturing Co.,** Copiague, L. I., N. Y., as general manager. He will supervise the fabrication of plastic aircraft and industrial parts.

Frank J. Frey has been named sales manager of the Vinyl Flooring Div., **Southbridge Plastics, Inc.,** 470 Fourth Ave., New York 16, N. Y. He was formerly with the Lifewall Div., **Pantasote Co.,** as sales promotion manager and technical director of installations.

Robert L. Simmonds, manager of the Newark, N. J., plastics plant of **Celanese Corportion of America** for the last 15 years, has retired from the company and has been succeeded by **Harry Cooper, Jr.,** former assistant plant manager.

Mr. Simmonds was first employed by the old Celluloid Corp. in Sept. 1914, and advanced through virtually all departments before becoming plant manager in March 1934.

Laurence P. B. Merriam, managing director of British Xylonite, Ltd., and well known to many in the plastics industry here, has been knighted in recognition of his service as examiner of controls of the British Board of Trade. He was responsible last year for removing many of the controls which had been instituted during the war.

Deceased

James M. Davidson, superintendent of the Buffalo, N. Y., plant of Farrel-Birmingham Co., Inc., died July 15 following a brief illness. He had been with Farrel-Birmingham since 1920.

MEETINGS

Sept. 6-8 — Regional meeting, American Institute of Chemical Engineers, Mount Royal Hotel, Montreal, Que., Can.

Sept. 11-Nov. 20—"For Modern Living" exhibition by Detroit Institute of Arts, Detroit, Mich. Examples of contemporary design for the home will be shown, including those made of plastics.

Sept. 18-23—116th National meeting of American Chemical Society, Atlantic City, N. J.

Oct. 10-14—First Pacific area national meeting, American Society for Testing Materials, San Francisco, Cal.

Oct. 31-Nov. 2 — 17th Annual Meeting, Packaging Machinery Manufacturers Inst., Edgewater Beach Hotel, Chicago, Ill.

Nov. 1-5—Pacific Industrial Conferences, running concurrently with the Pacific Chemical Exposition, San Francisco Civic Auditorium, San Francisco, Calif.

Nov. 28-Dec. 3—22nd Exposition of Chemical Industries, Grand Central Palace, New York, N. Y.

S.P.E. Meetings

Sept. 20 — Baltimore-Washington section of S.P.E., 8 p. m., at the Materials Testing Laboratory of the National Bureau of Standards, Reno Road and Van Ness St., N.W., Washington, D. C. Vernon M. Howe, Cellulose Products Div., Eastman Kodak Co., will discuss applications of cellulose ester plastic film and sheeting.

Sept. 21—New York Section of S.P.E., 6 p. m., at the Hotel Shelburne, New York, N. Y. Includes showing of S.P.I. film, "A Scientific Approach to Better Plastics."

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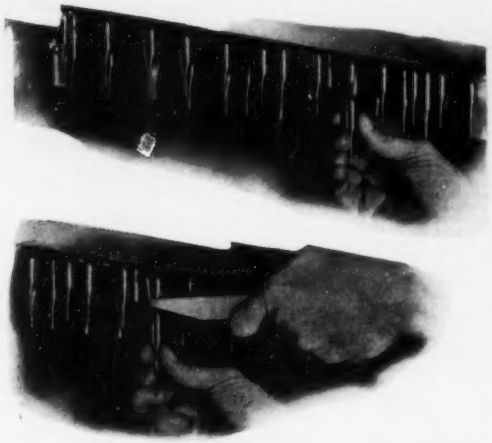

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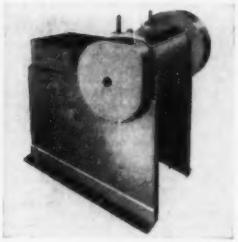
1—#3A Banbury Mixer, complete.
6—Royle Extruders, sizes 1-4.
1—Thropp 6" x 16" Lab Mill, complete Hydraulic Presses, all sizes and capacities; Rotary & Single Punch Tablet Machines; Plastic Mixers; Scrap Grinders. YOUR INQUIRIES INVITED. Eagle Industries, Inc., 110 Washington St., New York 6, N. Y. Tel. Digby 4-8364-5-6.

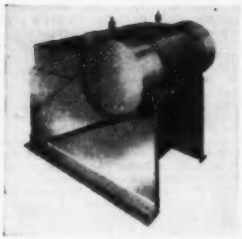
STOKES ROTARY 16 punch pellet presses. Heavy duty double arm jacketed mixers 15 gal., 25 gal., 100 gal., 250 gal. PERRY EQUIPMENT CORP., 1529 W. Thompson St., Phila. 21, Pa.

(Continued on page 184)

Cumberland Machines for the Plastics Industry

New!





CUMBERLAND ROTARY CHOPPING MACHINE

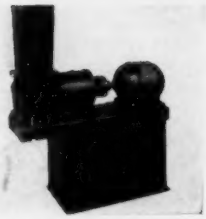
This machine cuts slab material from compounding mills, chops continously extruded rods, sheets of stands and cuts up calendar roll side shear strips. This machine is also used in conjunction with extrusion machines to produce cube or pellet material suitable for a molding compound.

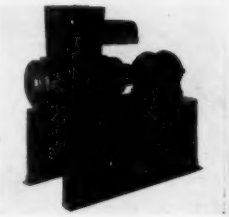
CUMBERLAND SLITTING & MANGLING MACHINE

This machine is useful primarily to manufacturers who compound plastic materials. The machine may be used to reduce material for use as a commercial product without further granulating. Or it may be used to prepare material for subsequent final reduction in a granulating machine.

CUMBERLAND PLASTICS GRANULATING MACHINES

These machines are designed especially for plastics. They perform with high efficiency the special cutting requirements of plastic materials. They are simple in design, rugged in construction and are easy to dismantle and clean. These machines are built in two styles. Nos. 0, ½ and 1½ as at top right (No. ½ is illustrated). Also, large 19' machine, double hung, with retractable knife block for complete accessibility. (illustrated at right below.)





REQUEST CATALOGS

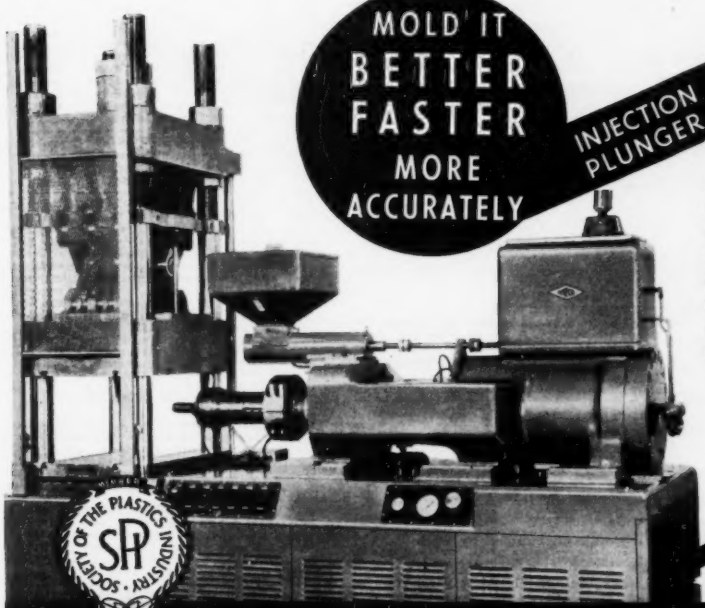
Plastics Granulating Machines .....No. 200
Slitting and Mangling Machine .....No. 300
Rotary Chopping Machine .....No. 400

CUMBERLAND ENGINEERING COMPANY, INC.

Dept. (A), Box 216, Providence, Rhode Island

MOLD IT BETTER FASTER MORE ACCURATELY

INJECTION – COMPRESSION PLUNGER and TRANSFER



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Model shown is 22 oz. machine

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ACCURATE MOLDING CORPORATION

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LONG ISLAND CITY 1, N.Y.

CLASSIFIED ADVERTISING

(*Continued from page 182*)

FOR SALE

Latest model Reed-Prentice 4 oz. machine. . . Excellent condition. . . Owner requires larger machine. . . Reply Box C1025 Modern Plastics.

HYDRAULIC PRESSES

Five 375 ton Hydraulic Presses, 30" x 24" bed, 18" ram, 15" stroke having 30" daylight, four post type, including hydraulic pushbacks 14 ton capacity. Complete with Vickers high and low pressure pumping unit, 36 gallon low, 3 gallons high, with 7½" H.P. motor, 1¼" Four Way Vickers valve pump control, unloader, and 75 gallon tank set up as one unit. Price—Each $2850.00.

Can be seen at
388 Warren St., Brooklyn, N. Y.
Plastic Insulator Co., 369 Lexington Avenue, New York 17, N. Y.

Machinery Wanted

WANTED—Stokes Model #235, 50-Ton Automatic Molding Presses. Write, giving condition of machine, serial number and price. Reply Box C1006 Modern Plastics.

WANTED—1—Day Mogal Type Mixer, Size 5. 1—Royle #1 Extruder. Reply Box C1020 Modern Plastics.

WANTED

Stokes model R, or equivalent, preform machine also electronic preheater 2 or 3 KW. Write to R. E. C. Manufacturing Corp., Holliston, Massachusetts.

Help Wanted

CHEMIST—Experienced in Polymerization of Styrene Monomer to manufacture of injection compound in all its phases. This is a very good opportunity for the right man with a reliable eastern firm. Your letters will be kept in the strictest confidence. Reply Box C987, Modern Plastics.

PLASTIC ENGINEER WANTED; Mechanical Engineer preferred. Must have experience on molding of clutch facings, mold design and plant operation. Give full resume of experience, references and salary desired. Reply Box C1026 Modern Plastics.

SALESMAN. To sell Vinyl sheets to fabricators. Must be experienced and come well recommended. To the proper person, this is an opportunity of a life time. All replies will be kept confidentially. Reply Box C988, Modern Plastics.

WANTED
SALES REPRESENTATIVES
by established manufacturer of complete line mold sets and component parts. Engineering background desirable. Straight commission, territories protected. Areas available: Chicago, Cleveland, Pittsburgh and parts of New England. Write in detail, confidentially. Reply Box C1027 Modern Plastics.

WANTED—Dynamic Promotion and Idea Man with "plenty on the ball" to handle sales on national basis for outstanding injection molder and extruder. Good salary and wonderful incentive for the right man. Write full details and particulars Box C1028 Modern Plastics.

Molds Wanted

BRITISH INJECTION MOULDER seeks moulds of successful American lines for 8, 3 and 1½ oz. machines on purchase, short hire or Royalty Basis. Replies with six samples of each product to "Alfa" Plastics Ltd., 20/21 St. Dunstan's Hill, London. E.C.3. England.

INTERESTED IN PURCHASING ALL TYPES OF FANCY COMPRESSION BUTTON MOLDS. Reply Box C1037 Modern Plastics.

WANTED TO PURCHASE
Obsolete or discontinued Plastic Injection Toy Molds. State condition and best cash price. Reply Box C1036 Modern Plastics.

ONE LARGE CHARM MOULD wanted for use in Canada. Will purchase or pay Royalty. Advise number of cavities, along with samples from mould and other details. Box C1038 Modern Plastics.

VICE PRESIDENT of important South American injection factory, now in New York for limited period, seeks USED MOLDS for 8 oz., 4 oz., 2 oz. injection machines, especially toys, for 3 to 6 months rental period. Account and molds guaranteed by well-known, bonafide U.S.A. firm. Send detailed offers, together with samples, by special delivery mail, to Box 1015, MODERN PLASTICS, 122 East 42nd St., New York 17, N. Y.

Situations Wanted

MOLD DESIGN ENGINEER—Ten years of injection and compression experience. Presently employed by large molding concern as head of mold and product design department. Seeks similar connection with progressive molding company. Reply Box C1041 Modern Plastics.

AVAILABLE. PLASTICS AND RUBBER ENGINEER. Experience with most plastics, synthetic rubbers, rubber-resin blends; and in major processing methods except injection molding. Developed prominent line of vinyl hose. Qualified in product and compound development, testing, production. B.S. Chemical Engineering. Eight years industrial experience, four in plastics. Single, age 32. Reply Box C1029 Modern Plastics.

PLASTIC ENGINEER AVAILABLE. Practical man, 10 years experience in injection, compression, transfer, extrusion, and low pressure laminating. This includes product design, tool design, estimating, sales service, production, and material testing. Wide experience in development field. Can design and create. Have written technical articles. Locate in Midwest. Desires position in development, sales, management, or engineering. Graduate chemical engineer. Age 33. Reply Box C1030 Modern Plastics.

ENGLISHMAN (41) seeks post with American or Canadian Manufacturers. For past twenty years has held a series of high executive posts with group of leading Rubber & Plastic manufacturers in England and for the last six years has been vice president of the group. Has traveled widely throughout Europe and the States and has a wide knowledge of manufacturing and production technique. He has many high qualifications and is well known in industrial circles in England.
For some years has specialized in Research and the study of really economic production and administration within the factory. Is seeking an executive post of real responsibility involving hard work—alternatively is prepared to act in a consultative capacity on certain pre-determined lines. Full details will be airmailed in confidence upon request. Write Box C1031 Modern Plastics.

AVAILABLE: Practical man with engineering background seeks managerial type position. Over twenty years experience on all methods of fabrication of all types thermoplastic materials. Strong on engineering and supervision of manufacture through all phases of operations. Complete technical background for proper material selection and product application. Several years field experience on sales, product development, and technical service. Prefer East location if possible. Box C1033 Modern Plastics.

FOREMAN—Millroom—Plastics & rubber. Calendering, compounding, molding. 9 years experience. New England residence. Reply Box C1032 Modern Plastics.

A RESPONSIBLE EXPERIENCED man with thorough knowledge of business and technique of plastic industry. Production, development, plant design, process and product development. Many years background in all phases of vinyl compounding, floor tile production, wire insulation; also cellulose acetate, styrene, etc. Was successful manager of compounding plant for many years. Wide knowledge of engineering chemistry and production of polystyrene polymerization. Sheet production by extrusion. Am known throughout the industry. Reply Box C1040 Modern Plastics.

Materials Wanted

WANTED: PLASTIC Scrap or Rejects in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

EXTRUDER AND MOLDER—WILL buy Polyethylene or Polythene any color—1. Virgin material. 2. Reground material. 3. Sheet stock trimmings. 4. Other. Write us formula, quantity, color and condition. Reply Box C909, Modern Plastics.

UREA AND MELAMINE WANTED—We buy your odds and ends of Urea and Melamine molding compound for highest cash prices. Lots of 200 pounds and up, in factory-sealed drums only. Reply, stating age and color to Box C980, Modern Plastics.

(*Continued on page 186*)

Controlled

OPERATING TEMPERATURES TO 650° F

The Royle Temperature Control Unit is designed to eliminate uncertainty in extrusion and other industrial processes which require accurate and constantly maintained operating temperatures of extended periods of time. This compact and simply operated unit will supply—or drain—heat in accordance with process specifications as established by laboratory experiments. Features are built into the self-contained Royle Temperature Control Unit to assure maximum results with a minimum of maintenance.

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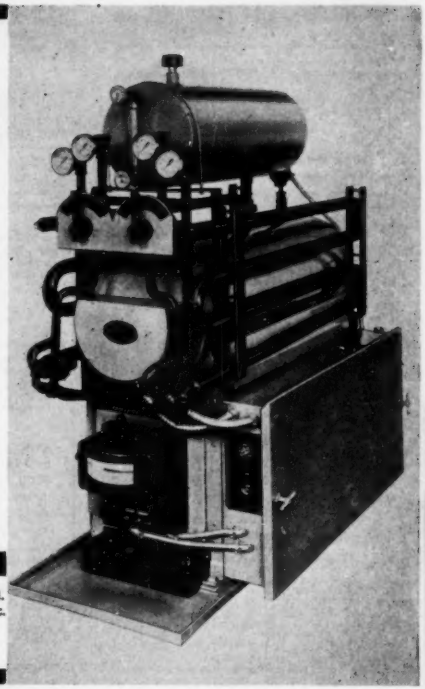

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CLASSIFIED ADVERTISING

(Continued from page 184)

WANTED: Plastic Scrap. Rigid Vinyl, Cellulose Acetate, Polystyrene. Custom grinding, magnetizing and X-raying. Compounding time available. Franklin Jeffrey Corp., 1671 McDonald Ave., Brooklyn, N. Y. Es 5-7943.

Representatives Wanted

MODERN MIDWEST Injection Molding Plant with experienced plant operating personal, with proven record of efficient production desires sales representation on commission basis. Complete service available for design, mold construction and dependable high production runs to satisfy Industrial, Premium or Chain store outlets. Reply Box C1018 Modern Plastics.

Agencies sought for U.K. and Europe for latest inventions Luminous Plastics suitable for road safety signs and other uses. Advertiser well introduced in Plastic Trade. Best references. N. Bucknall, All Plastic Materials, 1/3 St. Paul's Churchyard, E.C.4. Telegrams Bucknic London.

MIDWEST MOLDER OF THERMOSETTING Materials Desires Sales Representative in New York and Surrounding Territory. Also Chicago Area. Reply Box C1016 Modern Plastics

RESIN MANUFACTURER wants Representatives experienced in sales PHENOLIC and UREA Resins—liquid and powder. Will make commission arrangement if desired. Confidential. Our men know about this advertisement. Reply Box C1034 Modern Plastics.

WE WOULD LIKE to contact Manufacturers of Plastic specialties, notions or novelties that will sell for under $1.00 and under $2.00. Reply Box C1035 Modern Plastics.

Miscellaneous

CELLULOIDS

Available for sale—Large quantities of .060 and .145 stock in blue, red, green, demi-blonde, black and pink cloud, 50% below list price.

K. STENZEL & SONS, INC.
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New York 13, N. Y.

WANTED: Complete plants, also individual items such as: Mixers, grinders, 2-roll mills, extruders, etc. Reply Box C1019 Modern Plastics.

FOR SALE, 10,000 lbs. black Saran pellets also Saran cylinder for 8 oz. Reed Prentice. Both at bargain prices. Kampa Manufacturing Co., 411 E. Mason St., Milwaukee, Wis.

SCANDINAVIAN PLASTIC FACTORY—wants to rent plastic moulds on a license basis. Only items of up to 2 oz. of interest. For further details please apply to: Sven Hogsgaard, 8 State Street, New York 4, N. Y.

HAVE YOU DIFFICULTY IN SELLING to Sterling areas? Why not let us have the moulds and we manufacture the articles for you either on Royalty or Profit Sharing Basis. Replies to "Injector" Box C1017 Modern Plastics.

BUSINESS FOR SALE—Small injection molding and fabrication plant in the Northwest. New 2 oz. "Hymac" injection machine, infra red oven, Preco press, thermofolder, saws, drill press, etc. Ideally situated. Sale includes name and patented item in production. Clients priced for immediate sale. Reply Box C1039 Modern Plastics.

IF YOU HAVE GOOD HYDRAULIC PRESSES with modern pumping equipment for sale send me your specifications of same with photo, and I will see to it that you will get the best price available. Announcing: Hydraulic Sal-Press Co., Inc., formerly Sal's Press, located at 386-390 Warren St., Brooklyn, N. Y. Will continue to render its usual good service.

LINES WANTED

Sales representative, New York specializing in 5¢ to $1.00 items suitable for big Chain Stores, desires to contact manufacturers of plastic specialties, housewares, toys, notions, stationery or novelties. I have over 20 years experience, an extensive following and can market your products in volume. Commission basis. Reply Box C867 Modern Plastics.

PATENT RIGHTS for sale or License. Patent, 2,415,209, GROMMET SPINDLE. Pat. Feb. 4th 1947. A moulded, all-plastic, grommet spindle for use in manually producing cotton string grommets which are essentials in ship building and repairing. Figures embossed on the ends of the spindles indicate the diameter of the spindle. Accurate measurements; flexible molding at low cost; international markets. Write, Morten B. Michelsen, Antonito, RFD 164, Colorado. (Group 37-31-32-30-81. Register No. 8,193.)

LIST YOUR USED Plastic Equipment with us. We Have Buyers. Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

BARKER-DAVIS ROTARY CUT-OFF ATTACHMENT FOR EXTRUDING MACHINE CONVEYORS

It is the first of its kind used in plastic and rubber extruding machines. Multiple rotary blades cut through the stock and position for the next cut automatically. It is controlled by timer and solenoid activated single revolution clutch—cuts sheets and tubes cleanly and accurately. It will take any desired length up to 30 ft. It is claimed by users that it speeds up production, eliminating one operator and quickly pays for itself. The timer or cut-off may be purchased separately if desired. Has ½ H.P. motor — weighs 325 lbs. — Timer weight, 50 lbs.

Write for bulletin sheet.

BARKER-DAVIS MACHINE CO., INC.
LEOMINSTER, MASS.

Reduce Pre-Mixing Time. Secure Complete, Uniform Dispersion of Plastics Ingredients. Profit from Improved Color Blending with the

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The "ENTOLETER" Mixer provides the simplest, most economical method of producing a homogeneous mix. It is easy to install and operate. Requires only 12 cubic feet of space; yet can produce a finished mix at rates up to 200 lbs. a minute. It is adaptable to either continuous or batch mixing. Send for bulletin and reprint describing results on plastics applications. Entoleter Division, The Safety Car Heating & Lighting Co., Inc., 1195 Dixwell Ave., New Haven 4, Conn.

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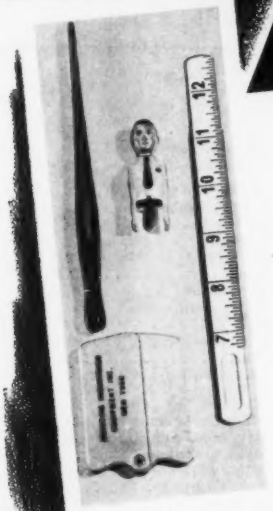

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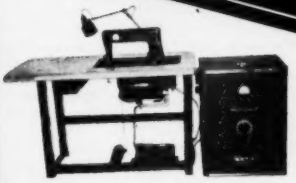

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SEPTEMBER, 1949

Accurate Molding Corp. 183
Allied Products Corp. 70, 181
All Purpose Gold Corp. 165
American Colorgraph Co. 156
American Cyanamid Co., Industrial Chemical Div. 123
American Cyanamid Co., Plastics Div. 112, 113
American Insulator Corp. 74
American Molding Powder & Chemical Corp. 177
American Pulverizer Co. 143
Amos Molded Plastics 42
Anderson Bros. Mfg. Co. 169
Argenta Products Co. 145
Art Roll Leaf Stamping Co. 155
Atlas Valve Co. 161
Atrax Company, The 143

Bakelite Corporation Inside Back Cover
Bakelite Corporation 139, 140
Baldwin Locomotive Works, The 48, 49
Bamberger, A., Corp. 173
Barker & Davis Machine Co., Inc. 186
Barrett Div., The Allied Chemical & Dye Corp. 129
Bethlehem Steel Co. 44
Boonton Molding Co., The 149
Borden Co., The, Chemical Div. 54
Boruski, Ernest F., Jr. 138
Bridgeport Moulded Products, Inc. 18
Buttondex Corporation 147

Cabot, Godfrey L., Inc. 39
Carbide & Carbon Chemicals Corp. 69
Carborundum Company, The .. 131
Carver, Fred S., Inc. 52
Cast Optics Corp. 146
Catalin Corporation of America 1
Celanese Corp. of America, Plastics Div. 9
Chicago Molded Products Corp. 4
Claremont Waste Mfg. Co. 114
Classified 182, 4, 6
Cleveland Plastics Inc. 165
Columbia Protektosite Co., Inc. 20
Continental Can Co. 64
Cruver Mfg. Company 34
Cumberland Engineering Co., Inc. 183

Detroit Macoid Corp. 163
Detroit Mold Engineering Co. .. 138
Diemolding Corp. 166
Dow Chemical Co., The 171
Drakenfeld, B. F., & Co., Inc. .. 150
DuPont de Nemours, E. I., & Co., Inc., Plastics Dept. 7
Durez Plastics & Chemicals, Inc. .....Inside Front Cover

Eastman Kodak Co. 135
Elmes Engineering Div. of Amer. Steel Foundries 50
Enterprise School of Plastics .. 160
Erie Resistor Corp. 16
Eynard, E. 147, 159

Fabricon Products, Inc., Plastics Div. 165
Farrel-Birmingham Co., Inc. .. 62
Fellows Gear Shaper Co., The Plastics Machine Div. 55
Felsenthal, G., & Sons, Inc. .. 66
Ferro Chemical Corp. 175
Ferro Enamel Corp. 145
French Oil Mill Machinery Co., The 153

General American Transportation Corp. 28
General Electric Co. ....Back Cover
General Electric Co., Phenolic Materials Div. 47
Gering Products, Inc. 31, 32
Glenn Electric Heater 169
Goodrich, B. F., Chemical Co. ..3, 40
Goodyear Tire & Rubber Co., Chemical Div. 29, 63
Green Instrument Company ... 142

Hawley Products Co. 27
Hercules Powder Co. 57
Houghton, E. F., & Co. 144
Hydraulic Press Mfg. Co., The 13

Jackson & Church Co. 60, 61

Kimberly-Clark Corp. 154
Kingsley Stamping Machine Co. 168
Kirk, F. J., Molding Co. 187
Koppers Co., Inc. 59
Kuhn & Jacob Molding & Tool Co. 126
Kurz-Kasch, Inc. 56

Lane, J. H., & Co., Inc. 142
LaRose, W. T., & Associates .. 30
Lester-Phoenix, Inc. 68
Lucidol Div., Novadel-Agene Corp. 149

McCarthy Chemical Co. 65
MacRay Engineering Co. 137
Marblette Corporation, The ...10, 11
Martin, Glenn L., Co., The 35
Martindell Molding Co. 153
Mayflower Electronic Devices, Inc. 187
Mearl Corporation, The 164
Mears-Kane-Ofeldt, Inc. 175
Michigan Molded Plastics, Inc. 159
Midland Die & Engraving Co. 102
Mills, Elmer E., Corp. 21
Minnesota Plastics Corp. 41
Mirro-Plex, Inc. 177
Modern Plastic Machinery Corp. 38
Molded Products Corp. 22
Monsanto Chemical Co., Organic Div. 67
Monsanto Chemical Co., Plastics Div. 45
Mosinee Paper Mills Co. 121
Moslo Machinery Co. 151
Muehlstein, H., & Co., Inc. .. 151

Nash, J. M. Company 58
National Rubber Machinery Co. 33
New Hermes 144
Newark Die Co. 162
Nixon Nitration Works 17
Northern Industrial Chemical Co. 141
Norton Laboratories, Inc. 46
Orange Machine Products Inc. 149

Parker-Kalon Corp. 189
Plaskon Div., Libbey-Owens-Ford Glass Co. 108, 109
Plastics Industries Technical Institute, Dept. of West Coast University 153
Plax Corporation 51
Preis, H. P., Engraving Machine Co. 150
Printing Industries Equipment Co., Inc. 187
Prophylactic Brush Co. 36

Radio Receptor Co., Inc. 161
Railway Express Agency 155
Rapid Shoe Machine Mfg. Corp. 155
Recto Molded Products, Inc. .. 152
Reed-Prentice Corporation 8
Richardson Company, The 6
Rohm & Haas Co., Plastics Div. 179
Rohm & Haas Co., Resinous Products Div. 125
Ross, Charles & Son Co. 160
Royle, John & Sons 185

Safety Car Heating & Lighting Co., Inc., Entoleter Div. 186
Santay Corporation 73
Schulman, A., Inc. 185
Schwartz Chemical Co., Inc. ... 152
Sillcocks-Miller Co., The 136
Standard Products Co., The 145
Standard Tool Co. 154
Stanley Chemical Co. 168
Stokes, F. J., Machine Co. 127
Stricker-Brunhuber Corp. 156
Swedlow Plastics Co. 167

Tennessee Eastman Corp. 117
Thropp, Wm., R., & Sons Co. .. 148
Timken Roller Bearing Co., The 53
Titanium Pigment Corp. 23
Tracerlab, Inc. 12
Trico Products Corp. 162
Tupper Corporation 26

Van Dorn Iron Works Co., The 133
Varcum Chemical Corp. 37
Victory Mfg. Company 177

Waldron, John Corp. 141
Waterbury Companies, Inc. ... 146
Watertown Mfg. Co. 164
Watlow Electric Mfg. Co. 147
Watson-Standard Co., The 181
Watson-Stillman Co. 14, 15
Welding Engineers, Inc. 24, 25
Westchester Plastics Inc. 72
Western Felt Works 166
White, S. S., Dental Mfg. Co., The 175
Windsor, R. H., Ltd. 19
Wirz, A. H., Inc. 173
Witco Chemical Co. 43
Worcester Moulded Plastics Co. 190

Yardley Plastics Co. 71

Why Industry's leading Distributors keep proved savings for you in stock

Your Distributor's stock of P-K Self-tapping Screws is a shelf full of savings for you. When you order, he delivers not simply screws, but a proved means of lowering assembly costs . . . as much as 50% or more.

Wherever your plant is located, in the United States or Canada, there's a Parker-Kalon Distributor nearby, ready to give you quick, helpful service. And you'll find he's the leading Distributor in your area, because, keenly aware of industry's needs, he offers those products which sell best because they serve most.

That's why he stocks and sells P-K Self-tapping Screws. He knows that, when you choose P-K, you get *more "know-how"*—Parker-Kalon originated the Self-tapping Screw and has been the leader with new designs ever since . . . *more "show how"*—P-K's staff of Assembly Engineers has helped solve nearly a million application problems . . . *more choice of types and sizes*—with a complete line of Self-tapping Screws for every metal and plastic assembly, P-K's advice is unbiased . . . *more exacting quality control*—P-K's investment in laboratory testing and inspection equipment is unsurpassed . . . *more production*—Parker-Kalon is the world's leading manufacturer of Self-tapping Screws.

Let a P-K Assembly Engineer help you find out how you can simplify assemblies, improve strength, save time, and lower production costs with the simpler P-K method. If you prefer, mail assembly details for recommendations. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y.

REMEMBER . . . IF IT'S P-K . . . IT'S O.K.!

P-K® *The Original*

PARKER-KALON SELF-TAPPING SCREWS

FOR EVERY METAL AND PLASTIC ASSEMBLY

A Z HEX HEAD Z A, E, F, P-E AVAILABLE WITH PHILLIPS HEAD F U F-Z

P-K Also Makes *Cold-forged*

THUMB SCREWS WING NUTS

OTHER P-K PRODUCTS: Cold-Forged Socket Screws, Wing Nuts, Thumb Screws • Hardened Screwnails and Masonry Nails • Shur-Grip File and Solder Iron Handles • Metal Punches • Bumper Regulators and Accessories

Many a manufacturer fails to move an otherwise excellent product from the dealers' shelves because of old-fashioned packaging. In this era of self-service, *your* package must sell *your* product. As custom injection plastic moulders, we have taken a succession of products out from under the proverbial bushel and highlighted their sales appeal with transparent, durable, plastic packages. Our personnel stands ready to design and produce a selling package for you, of the size and in the shape that spells packaging success. We guarantee a volume production to dovetail with your own. If you want a package to steal the show, call on us. You'll discover it will cost less than you imagine.

Custom Injection Moulding

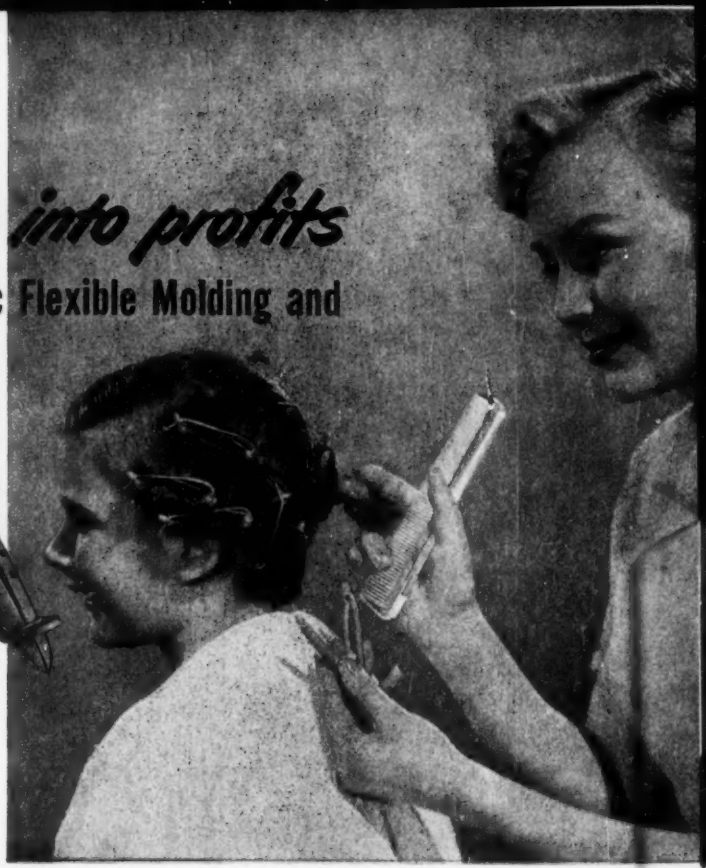
WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

Turn ideas into profits

with VINYLITE Plastic Flexible Molding and Extrusion Compounds



PLIABLE. Dream Curlers molded from VINYLITE Flexible compounds in one piece save cost of assembly. Soft and comfortable to wear—even overnight. They stay flexible and are unaffected by hair dressings, moisture or normal heat. By Tip-Top Products Co.

Many a dream product of yesterday has become a profit-maker of today because of VINYLITE Brand Plastic flexible molding and extrusion compounds.

Check the properties of these amazing materials. See for yourself their almost incredible versatility... the almost unlimited range of beautiful, sales-stimulating colors.

These wonderful hues go hand-in-hand with flexibility variable from semi-rigid to soft and rubbery. They increase the appeal of compounds that can be made resistant to water, oil, chemicals and fire.. compounds with excellent electrical properties. They are all molded by high speed injection processes.

Whether you are launching a new or seeking to improve an established product VINYLITE Plastic flexible molding and extrusion compounds can be specially formulated to the right balance of properties you need to keep your product in step with today's market. Write to Department GP-7 for detailed information.

BAKELITE CORPORATION
Unit of Union Carbide and Carbon Corporation UCC
30 East 42nd Street, New York 17, N.Y.

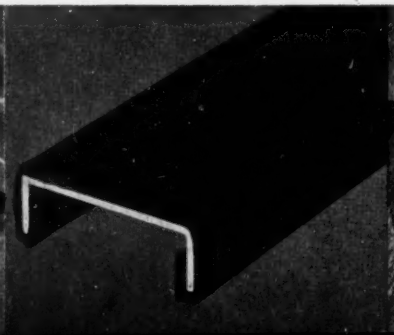
You know it's right if it's...

Vinylite BRAND **PLASTICS**

BAKELITE CORPORATION

LOW COST. Shoe lifts injection molded from VINYLITE Flexible compounds in one piece that serve for either left or right shoe... saves assembly operations, adds extra serviceability to children's footwear. Molded by Loma Plastics for O'Donnell Shoe Co.

DURABLE. Tread for ladder used in sleeping cars is extruded from VINYLITE Flexible plastic compound for low cost and ease of application . . . provides excellent non-skid characteristics . . . resists abrasion and wear. By Detroit Macoid Corporation.



EASILY FORMED even into complicated shapes VINYLITE Flexible compounds permit accurate reproductions such as these sturdy, attractive treads injection molded for a toy tractor replica of an International Harvester model by Product Miniature Co., Inc.

MOLDED IN PLASTICS BY GENERAL ELECTRIC

LOWER SELLING PRICE! The use of G-E plastics (instead of wood) for this television cabinet helps to make possible a low-priced set.
PLASTICS FOR INSULATION! This intricate contact shaft, molded by G. E., furnishes its own insulation, retains dimensional stability.
LARGE-VOLUME JOBS! G. E. is ideally equipped to mold large-quantity jobs—like parts for the new Argoflex "75" camera.
Soap dispenser molded by General Electric for the Voorhis-Tiebout Co., Red Hook, N. Y.

How G-E Plastics Can Help You MAKE A BETTER PRODUCT

Here's an instance where General Electric's plastics molding service helped a customer to obtain a stronger, better-looking product.

General Electric re-designed the SoapMaster soap dispenser for the Voorhis-Tiebout Co., Red Hook, N. Y. G-E design suggestions improved both the appearance and the mechanism of the dispenser. And by recommending a new material—white polystyrene—General Electric molders were able to effect important savings for the customer while producing a stronger, more attractive unit in large-volume lots.

This soap dispenser is a good example of what General Electric's *complete* plastics service might do for *your* product.

For low cost and high quality depend on General Electric's plastics service! One of the world's largest plastics molders, G. E. is ideally equipped for *large-volume* production. WRITE US FOR MORE INFORMATION on how this service can work for *you*. Or contact your nearest G-E sales office. Address: Plastics Division, Chemical Department, General Electric Company, 1 Plastics Avenue, Pittsfield, Mass.

GENERAL ELECTRIC

CD49-A46

General Electric plastics factories are located in Coshocton, Ohio, Decatur, Ill., Taunton and Pittsfield, Mass.